THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

NOVEMBER, 1894.

THE RELATIONS OF INFECTIOUS PROCESSES TO MENTAL DISEASE.[1]

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Nearly a century ago Benjamin Rush, when considering the etiology of intellectual derangement, declared that gout, dropsy, consumption, pregnancy, and fevers of all kinds, produced madness by acting upon the brain in common with the whole body; and in one way or another, before his time and since, the subject assigned to me in the opening of this discussion has claimed the attention of the medical profession. It is one aspect of the old humoral doctrine of disease in general, to which we now recur, aided by experimental research and not simply by clinical and pathological observation.

Are special types of mental disease ever due directly to infection? Are the mental disorders of well-known infectious diseases always toxæmic, or are they sometimes the result of toxæmia and sometimes of anæmia or exhaustion? Are particular types of insanity due to the action of specific micro-organisms? In other words, has acute mania a bacillus which belongs to it, and to it alone; has melancholia its special pathogenetic microbe; is a special type of confusional insanity of microbic origin; has general paralysis of the insane a *bacterium sui generis?* These questions lead us naturally to consider inferences and conclusions drawn—1, from clinical and clinico-pathological observations; 2, from

[1] Read before the Congress of American Physicians and Surgeons, Washington, D. C., June 1, 1894.

the analogies with nervous affections, not psychoses, but which are known or believed to be of microbic origin; 3, from the results of combined clinical, pathological, and bacteriological observations and investigations.

Clinical and clinico-pathological observations have furnished us with a literature comparatively voluminous, but for the purposes of this discussion its teachings can be compressed into a small space. Two valuable contributions are a paper by Hurd[1] on "Post-febrile Insanity," and a report made to the Congress of French Alienists, in August, 1893, by Drs. Regis and Chevalier-Lavaure[2] on "Auto-Intoxication in Mental Diseases."

Regis and Chevalier-Lavaure refer to many cases of insanity in which neither heredity, organic disease of the nerve centres, nor any of the disturbances designated as neuroses can be assigned as a cause. They attribute the mental disorder in these cases to the excessive production or storing of products which are usually accumulated in much less amount or are eliminated. The blood, organic liquids, and especially the urine, undergo various modifications, their composition changing with the type of mental disease. They distinguish mental disorders as due—1, to infectious diseases; 2, to visceral disturbances; and 3, those associated with diathetic maladies. The second class includes mental disorders of hepatic and renal origin. They refer to the importance of studies of the toxicity of the intestinal contents, which recalls the important researches of Herter[3] on the relationship of the toxic products of intestinal putrefaction to epileptic seizures, presented in a paper read before the American Neurological Association in 1892. In the third group of insanities dependent upon auto-intoxication are included those occurring under the influence of such diatheses as arthritism, herpetism, diabetes, cancer, etc. Regis and Chevalier-Lavaure query whether or not general paralysis of the insane is not sometimes due to infection, and Parant, commenting on this suggestion, remarks that we sometimes see cases of mental confusion ending in a progressive paralytic failure, with delusions somewhat different, but with other symptoms of general paralysis, and that, therefore, while this opinion is not susceptible of any great generalization, it is nevertheless based upon actual facts.

With Hurd, I believe that we should recognize the fact that mental disorders described under the general head of confusional insanity—and I might add other types and sub-types—should be regarded as developing either from specific poisoning, from shock, or from anæmia and nervous exhaustion. Under the head of insanity from specific poisons, Hurd

[1] Read before the Medical and Chirurgical Faculty of Maryland, April 28, 1892. Amer. Journ. of Insanity, July, 1892.

[2] Summarized by Parant in the American Journal of Insanity, January, 1894, vol. i, No. 3, p. 423.

[3] Herter: Journal of Nervous and Mental Disease, August, 1892, N. S., vol. xvii. p. 644.

comprises "the delirium of fevers, both intermittent and exanthematous, of pneumonia, of uræmic poisoning, the transient insanity of influenza, the mental confusion of multiple neuritis, the delirium of iodoform, salicylic acid, and chronic alcoholic poisoning, and the delirium of puerperal fever. In this group of cases we have a poison acting directly upon the central or peripheral nervous system, producing an intoxication as shown by incoherence of ideas, confusion and a more or less rapid flow of thought. This poison may be of the nature of uræmia or of some toxic albumins—Welch has shown these to be produced in pneumonia and diphtheria, which possess a special toxicity to the nervous system—or an intoxicating drug which has a prolonged action. These poisons produce an active delirium which is generally self-limited and disappears when the exciting cause is removed and the period of convalescence established." While fully admitting the development of insanity from specific poisons, Hurd believes, however, that mistakes have arisen by confounding the confusion of febrile delirium with true post-febrile insanity. As the essential feature of delirium is mental confusion, and as delirium is often the product of toxæmia, well illustrated by drug-intoxications, this febrile delirium, at least, is toxic in origin; the insanity which follows may sometimes be due to persisting toxæmia, but in many cases it is the result of shock, anæmia, or nervous exhaustion.

Between 1834 and 1865, Chomel, Esquirol, Simon, Sauvet, Thore and Baillarger—cited by Hurd—described the mental disorders that accompany typhoid and other forms of fever, and among later writers Clouston,[1] Wood,[2] and Tuke and Woodhead,[3] have especially considered the subject. Febrile and post-febrile insanities have been shown by Nasse[4] and Spitzka[5] to be of not rare occurrence in children; the fevers, during or after which they develop most often these mental affections, being typhoid, scarlet fever, measles, rheumatism, and diphtheria. Clouston and Wood both regard post-febrile insanity as due to the anæmia and exhaustion which result from acute infectious disorders; and the latter has proposed to include under "confusional insanity" a special group of cases following infectious diseases, injuries, operations, and other causes. Korsakoff[6] regards the mental confusion, or confusional insanity, described by Clouston, Wood, Hurd, and others preceding them, as essentially a toxæmia, due to a special poison such as is developed in multiple neuritis, influenza, and other infectious disorders. According to Tuke and Woodhead, in the acute maniacal delirium which occasion-

[1] Clouston: Clinical Lectures on Mental Diseases, 1884, p. 416.
[2] Wood: University Medical Magazine, Dec. 1889, vol. ii. p. 117.
[3] Tuke and Woodhead: Tuke's Dictionary of Psychological Medicine, vol. ii. p. 911.
[4] Nasse: Allgemeine Zeitschrift für Psychiatrie, Berlin, 1870. p. 11.
[5] Spitzka: Keating's Cyclopædia of the Diseases of Children, vol. iv. p. 1046.
[6] Korsakoff: Allgemeine Zeitschrift für Psychiatrie, 1889, H. 4, p. 475.

ally presents itself during the course of infective fevers, the two factors which should be taken into consideration are: first, the specific poison which appears to act directly on the nerve cells, giving rise to stimulation and impaired nutrition and consequent granular degeneration; and secondly, the high temperature during the persistence of which metabolic, or to speak more accurately catabolic, processes go on rapidly. In very acute cases extraordinary proliferation of connective-tissue cells round the vessels, and migration of leucocytes, take place—this being a condition commonly associated with the presence of micro-organisms, and well marked in acute exudative meningitis.

Numerous isolated cases of acute delirium, acute mania, acute confusional insanity, so called, and other forms of acute mental disease, variously designated, occurring in connection with fevers like typhoid, have in recent years been reported in medical journals, but I can only here refer to a very few of these.

An argument in favor of the mental disorders of infectious diseases being due to toxæmia rather than to anæmia or exhaustion is furnished by the well-known fact that such diseases are sometimes ushered in by violent mental manifestations, or that such manifestations are the chief features of the disease, which pursues a course which is largely afebrile. I have seen and recorded several cases of typhoid fever which began or were preceded by an acute delirium, which closely simulated, and in some cases was diagnosticated as, common acute mania. A form of afebrile typhoid fever with severe cerebral symptoms has been recorded by Gerloczy:[1]

A girl, nine years old, was taken sick with headache, chill, and fever, and soon became noisy and restless, and eleven days after the onset was comatose and screamed and tossed incessantly. Meningitis was suspected; the temperature never rose above 39° C. The treatment consisted of ice-cap and small doses of chloral at night. On the seventeenth day of the disease she became more quiet, so that an examination was possible, and this among other things showed a swollen spleen. From this time a gradual improvement took place. On the twenty-fifth day the child became conscious, and from the twentieth to the thirtieth numerous furuncles developed. Convalescence was interrupted by a rubeolous eruption without fever, but otherwise progressed favorably.

Chaslin[2] has described a form of mental disorder, usually acute, which is neither mania nor melancholia, which may be attributed to a rapid depression of the nerve centres from infection or auto-intoxication, and which he believed to be an intermediary form between functional psychoses and insanities with well-marked and profound lesions—although it assumes often the character of a true disease by the somatic

[1] Gerloczy: Deutsche med. Wochenschr., April 14, 1892, No. 15, p. 328.

[2] Chaslin: Annales Medico-psychologiques, Paris, 1892, p. 225. Cited in La Sémaine Médicale, Paris, August 10, 1892.

phenomena. It is characterized by confusion of ideas, perception, and personal apperception. It may or may not be accompanied by hallucinations; motor agitations, depression, or stupor may be present. The disorder has a great analogy with the delirium of chronic intoxication, and has been designated under the name of "mental confusion." Cases similar to Chaslin's have been recorded by others. Liebermeister has attributed the great depression of temperature in such cases to the action of a virus—microbic or chemical—on the heat-regulating centres. The insanity of sunstroke is probably dependent upon a toxic condition, and by some is believed to be the result of catabolic changes produced by high temperature.[1]

The somatic and psychical cerebral symptoms which accompany these infectious febrile disorders are not infrequently attributed to meningitis, or even encephalitis, and the patients are sometimes treated on the supposition that they are suffering from intracranial inflammatory affections, which are indeed occasionally present. These diagnoses are seldom corroborated by autopsies, and with our present lights the evidence—clinical and pathological—points rather to toxæmia.

Lloyd[2] and Tull[3] have reported cases of acute delirium without recognizable cause, leaning to the view that many such cases are infective in nature. The temperature in Tull's case—also seen by Lloyd—before death rose to 103.4° F. The autopsy revealed an uncertain incipient meningitis. Much negative pathological evidence in favor of the toxæmic origin of acute delirious seizures, like that afforded by the case of Lloyd and Tull, might be adduced, as many cases have been reported in which the autopsies were practically negative in their findings. My own experience has afforded several such cases, one of which is recorded in another paper.[4] I assisted at the autopsy of this case in the post-mortem room of the Philadelphia Hospital:

The woman, a patient of Dr. E. P. Davis, three hours before she was brought to the hospital by the police patrol, had been delivered of a child. She was in a state of acute mania, and her limbs were extremely hyperæsthetic, with active contractures, and a scattered petechial eruption. The symptoms were suggestive of a cerebro-spinal meningitis with diffuse neuritis; but the autopsy showed clearly that no meningitis was present, and doubtless the case was one of toxæmia associated with anæmia.

The modifying influence which it is claimed is exerted by certain infectious diseases on mental disease is worthy of passing notice in view of the present ideas regarding toxines and anti-toxines. Mayberry[5] has referred especially to the influence of facial erysipelas in cases of melan-

[1] J. Batty Tuke and German Sims Woodhead: Tuke's Dict. Psych. Med., 1892, vol. ii. p. 911.
[2] Lloyd: Medical News, Jan. 31, 1891, vol. lviii. p. 122.
[3] Tull: Ibid, p. 127.
[4] University Medical Magazine, May, 1893, vol. v. p. 611.
[5] Mayberry: Journal of Nervous and Mental Diseases, May, 1894, N. S., vol. xix. p. 298.

cholia; and Dinter, cited by Mayberry, has reported two cases of melancholia with erysipelas, one of which went on to recovery, and the other was improved only for a single day. In an epidemic of forty-four cases of facial erysipelas, Mayberry gives the results of the disease upon the mental condition as follows: "Three were cases of acute melancholia, one of whom went on to rapid recovery, one slowly improved from the time of the disease, and one remained unchanged; the two former were simple melancholia, and the latter melancholia agitata. Nine were cases of chronic melancholia, two of whom were temporarily improved; in one, a case of melancholia agitata, the delusions were more marked and the agitation greater; and six remained unchanged. One was a case of stuporous insanity, which seemed to begin to improve from the date of the sickness. Four were cases of acute mania, all of whom remained unchanged. Eleven were cases of chronic mania, one of whom had a lucid interval, while the other ten were not appreciably affected. Three were cases of paretic dementia, two of whom showed greater deterioration, and one remained unchanged. Two of epileptic mania remained unchanged. One of senile dementia became mentally weaker. Ten of terminal dementia showed no change." From these and similar observations on other cases, Mayberry was led to believe that erysipelas is more likely to favorably influence depressed cases of insanity of a comparatively short duration.

To the consideration of the analogies of certain insanities with affections of the nervous system not psychoses nor insanities, but which are known or believed to be of microbic origin, I shall give brief space, as this aspect of the discussion has necessarily been largely treated of by my colleagues. In the affections which are now claimed as microbic, some with a strong showing of facts and arguments, and some with evidence as conclusive as can be furnished by medical science, are now included multiple neuritis, some forms of myelitis, tetanus, tetany, Landry's paralysis, chorea, epilepsy, disseminated sclerosis, and paralysis agitans. Nearly all of these affections have or may have mental disorders associated with them.

The mental disorders of multiple neuritis have been frequently recorded. Several years ago[1] I called attention to the concurrence of multiple neuritis with both myelitis and encephalitis, but I believe now that most of these cases with mental symptoms were instances of toxæmia rather than encephalic inflammation. Fisher[2] has reported a case of multiple neuritis in which loss of time and place were marked symptoms—a similar condition to that which occurs in drug-toxæmias. Since the recent series of influenzal epidemics first appeared I have seen many cases of acute and chronic mental disease directly or indirectly

[1] Mills: Journ. of Nerv. and Ment. Dis., 1887, vol. xiv. p. 209.
[2] Fisher: N. Y. Medical Journal, Feb. 13, 1892, vol. lv. p. 186.

its offspring, and often associated with neuritis. A few of these have been fatal cases of acute mania, during or following closely upon the heels of the influenzal attack, but many have been chronic and milder forms of insanity or of mental disorder, not rising to the dignity of true insanity. To most of these I have referred more at length elsewhere.[1]

The microbic origin of some forms of myelitis with which mental affections are occasionally associated is now generally admitted; and choreic insanities with mental manifestations equalling in violence the motor disorder are well known. Regis[2] has reported a case of choreic insanity with a form of delirium which seemed to be closely akin to that of alcoholic delirium. Dana[3] has reported an interesting case, with autopsy and bacteriological investigation, in which was found a micro-organism closely resembling the diplococcus lanceolatus, which, he believes, gives weight to the belief that in some cases at least a microbe produces the disease.

Marie,[4] in his great work on *Diseases of the Spinal Cord*, has expressed his profound conviction that the most efficient cause of disseminated sclerosis is infection, or rather *infections*. As early as 1884 he asserted in categorical fashion this relation of cause and effect, having collected twenty-five cases in which disseminated sclerosis had followed acute diseases; a certain number of these cases having been described in 1879 in a memoir of Kahler and Pick. Marie holds that in certain infectious maladies symptoms of central nervous affection may develop during convalescence, and later may amend and disappear, but sometimes sclerosis, and especially disseminated sclerosis, arises with greater or less rapidity. He does not contend that disseminated sclerosis has its special microbe, but that this condition may appear in a crowd of infectious diseases which differ very much, one from the other; and that it is most frequently the result of one of the combined infections so frequent in the course of different infectious diseases. The infection is not so much due to a special microbe as it is to the localization of the infectious agencies in the nerve centres. If we accept the view of Marie regarding disseminated sclerosis, the same reasoning would lead us to believe that other forms of sclerosis and general paralysis of the insane—and perhaps neuro-systemic degenerations in general—are due to infection. Marie's[5] observations on the poliomyelitic origin of the lesions of the white medullary fasciculi in pellagra, general paralysis, and different combined scleroses, are of great importance in this connection.

[1] Mills: Trans. Phila. Co. Med. Soc., June 13, 1892, and Medical News, Jan. 30, 1892, p. 118.
[2] Regis: Journ. de Médecine de Bordeaux, July 20, 1890.
[3] Dana: Amer. Journ. Med. Sci., Jan., 1894, vol. cvii., No. 1, p. 31.
[4] Marie: Leçons sur les Maladies de la Moelle, 1892, pp. 140–142.
[5] Marie: La Sémaine Médicale, Jan. 13, 1894, p. 17.

Passing to the consideration of the results of combined clinical, pathological, and bacteriological investigations, the most valuable contribution which has thus far come from an association of clinical and laboratory work is an article entitled "A Contribution to the Etiology and Pathogenesis of Acute Delirium," by Dr. Carlo Rasori,[1] assistant physician to the Hospital for the Insane, at Bologna, the work emanating from Tizzoni's Laboratory for General Pathology.

As Rasori's paper is of great importance to our subject, and as it has not received the attention it deserves from the medical journals of this country, I shall refer in detail to its results.

Rasori describes in detail a case of acute delirium, with autopsy and the results of a careful bacteriological examination. At the outset he defines what he means by acute delirium, referring to the published work on this subject of Prof. Bianchi,[2] who has compiled the literature of the subject. A study of Bianchi's article shows, according to Rasori, that while authors agree upon the clinical picture and anatomico-pathological findings, their opinions with reference to the etiology and pathogenesis are often different and contradictory, and Rasori believes these differences are largely due to confounding different disorders and to the existence of transition forms, the most varying types of insanity having clinical episodes which sometimes give the picture of acute delirium. Acute delirium, as accepted by Rasori, is based upon Bianchi's descriptive definition—a general affection of the brain cortex which leads to a rapidly increasing and soon culminating dissolution of the psychical personality; with varying but severe disturbances of the senses and active excited movements; with quiet periods almost to the absence of consciousness; with intermissions of calmness; with convulsions, fever, early emaciation, rapid coma, and usually a fatal termination in from one to three weeks.

Rasori's patient was a woman, forty-five years old, without previous history of any moment. Her attack came on with persistent headache. She became confused and excited, talkative and incoherent, with a tendency to purposeless actions and to destructiveness, and refusal to take food. Her face was congested. She became noisier and more confused, consciousness was much disturbed, and she seemed to be the victim of terrible visual and aural hallucinations. Both pupils were sluggish and large, the right a little larger than the left. She had no fever, but she grew rapidly worse, developing opisthotonus, with clonic spasms of the facial muscles; noisy respiration, difficult deglutition, retention of urine, and rapid symptoms of exhaustion. Her temperature at the beginning was 38.5° C. On the evening before her death it reached 39.6° C. She died two weeks after the first appearance of the mental symptoms.

[1] Centralblatt für Bakteriologie und Parasitenkunde, October 20, 1893, Bd. xiv., No. 16, Jena, p. 509.

[2] Bianchi: Sull' Origine Infettiva di una forma di Delirio Acuto, per Prof. L. Bianchi e Dott. F. Piccinino (estratto degli Atti della R. Acad. Med.-chirurg. di Napoli, anno lxvii., Gennaio, Febbraio, N. S., No. 1). Napoli (Stab. Tipogr. A. Tocco, Cav. A. Tocco, S. Pietro a Maiella 31), 1893. Reference cited from Rasori's article, as I have not access to the publication of Bianchi.

The autopsy was conducted with the strictest antiseptic and bacteriological precautions. With a sterilized syringe fluid was removed from below the dura, and a part of it deposited in a sterilized tube of obliquely congealed agar, and these tubes were placed in a thermostat at about 35° C.

Marked congestion was present in the meninges and brain substance, also œdema and several hemorrhagic spots below the membranes. In the right temporal lobe the cortical substance was softened. The lungs were emphysematous, the lower lobes showing hypostasis and œdema, and an adhesive pleuritis on the left. The colon had areas of congestion.

Two inoculations with subdural fluid led to the development of the same micro-organisms, a small bacillus with rounded ends, three times as long as its width. Usually it appeared alone, but sometimes two or three were found hanging together by their ends. Besides the typical forms, others longer and either straight or twisted were present; these took the stain less readily. Rasori made numerous experiments and found that the micro-organism grew well in different culture media. His experiments with gelatin, bouillon, and agar cultures are given in detail. He was not able to say anything concerning the influence of physical or chemical agents upon the vitality of the micro-organism or the possibility of its development in amœbic conditions; he was only certain that its life was of short duration if the culture medium was not the proper one. He made a series of four inoculation experiments upon rabbits to establish the pathogenetic effect of the micro-organisms. The inoculations were made as follows: 1. Below the dura; 2. Below the skin; 3. Into the nose; and 4. A subcutaneous inoculation of a culture of blood agar obtained from the second experiment. Rigid antisepsis was employed.

The experiments demonstrated that the bacillus obtained from the subdural fluid of the patient grew and multiplied in the body of the rabbit, and produced a toxic substance which destroyed the animal, with symptoms of acute septicæmia, at a period varying from one and a half to six days.

The post-mortem findings of the animals were: Hyperæmia of the meninges, sub-pial hemorrhages, staining of the lungs, liver, and kidneys, and swelling of the spleen. Preparations were taken from the brain and spinal cord which showed, in addition to nervous elements and leucocytes, rich cultures of the kinds used in the inoculations.

"It would be premature," says Rasori, "to draw positive conclusions, from so small a number of experiments, about the special conditions which favor the natural infection, as well as about the most likely way permiting this micro-organism to enter the human organism, where it exerts its influence especially upon the central nervous system, as appears from the picture of this disease—which is usually fatal, according to the most prominent alienists. I reserve the privilege of completing in due time the investigations contained in this communication, and also of announcing the results of the histological observations which I shall make in the future."

In August, 1893, in consultation with Dr. Charles S. Potts and Dr. J. F. Berlet, of Philadelphia, I saw a case of acute delirious mania, a report of which has been made to the Philadelphia Neurological Society by Dr. Potts.[1] The patient, a professional man, thirty-three years of age, in the preceding June had been attacked with urticaria, lasting until August, when a carbuncle made its appearance on his upper lip. This was opened and curetted. For several days prior to the operation he had taken rather large quantities of whiskey and morphine; but these were stopped, and he did well for nine days, when he became violently delirious, with hallucinations, delusions, incoherence, great agitation and excitement. His temperature remained normal until three days after the attack, when it rose to 101° F., and continued to increase

[1] Potts: Journal of Nervous and Mental Disease, May, 1894, N. S., vol. xix. p. 338.

until three hours before death, when it reached 108.2°, at which time delirium gave place to coma. The autopsy, made seventeen hours after death, by Dr. J. W. McConnell, in the presence of Drs. Potts, Berlet, Klemm, and the writer, was practically negative. Cultures were made from the cerebro-spinal fluid by Dr. D. Braden Kyle, and demonstrated the presence of the so-called streptococcus lanceolatus, or pneumococcus of Fränkel and Weichselbaum, and also the staphylococcus pyogenes aureus and albus. Microscopical examination of the cortex showed perivascular exudation and leucocytes in the lymph-sheaths and perigangliar spaces. Dr. Potts, in reporting the case, suggests that as the germs isolated were those usually found in meningitis, the lack of microscopic findings was probably due to the fact that the toxæmia was so violent as to cause the death of the patient before naked-eye appearances had time to develop.

Through the kindness of Dr. M. V. Ball, of Philadelphia—to whom I am indebted for assistance and valuable suggestions in the preparation of this paper—I am able to present the report of an unpublished case of acute delirium with autopsy, and the results of a careful bacteriological examination.

The patient, a German, fifty-five years old, with a negative previous history, except of gonorrhœa and occasional rheumatic attacks, had been confined in prison for nearly eighteen months. He was suddenly attacked with delirium, having previously been to all intents and purposes in the best of health. He had marked delusions with hallucinations, and believed that people were coming to attack him. In his frenzy he tore up the furniture of his cell, destroyed his own property, and threatened death to anyone who would enter his cell. It became necessary to overpower him, but this was done as carefully as possible; and he was seen by Dr. Ball an hour after he had quieted down. He recognized the doctor, said that he felt dizzy, and that he believed this was due to a fall from his carriage some years before. Every now and then he would stoop down as if to pick up something, apparently because of hallucinations of sight. His whole appearance was of one in a fit of alcoholic delirium, but he had not had any liquor for eighteen months. He was given a mixture of hyoscyamus and bromide, and next morning seemed to be in a state of unnatural gladness. He had no fever, ate his food, and made no complaints; but he had said to his keeper, "If they are going to take me out to hang me they had better do so before breakfast"—clearly indicating delusions of persecution. In the evening he was quiet, but the next morning he was found hanging to the door of his cell, having strangled himself with the band of his pantaloons. When found he had evidently been dead several hours. The autopsy revealed under the dura several fresh patches of exudation; the pia was glassy and covered with two or three spots of a greenish-white exudate; the ventricles did not contain an unusual amount of serum. Three small round cysts filled with a milkish-colored gelatinous fluid were found in the choroid plexus on each side. Cultures were obtained from the ventricle serum and from the contents of the cysts.

The following is an extract from Dr. Ball's bacteriological report:

"In both cases in two days a fine growth occurred along the needle-track in a gelatin-agar tube—a sparse whitish growth on the surface of

the tube, not liquefying. The germ obtained was a very small bacterium arranged in twos and threes, resembling micrococci very much, but plainly larger in one diameter than in the other. Most curious was the growth or rather formation of needle-shaped crystals along the growth of the germ. The fine white, six-sided crystals arranged themselves in bundles and stars, giving a growth of most characteristic appearance. From the original growth many cultures have been obtained, giving rise to the same peculiarity. In gelatin alone, however, it has not been obtained, but in pure agar and in gelatin-agar there has been no difficulty. A chemist who made an examination of the crystals believes them to be a sulphate of some kind. I had an idea that it was a nitrite, but the reaction for nitric acid or ammonia was not obtained. The crystals can be plainly seen with the naked eye. What relation they bear to the growth is, of course, undeterminable without further study. The bacillus of lactic acid is the only germ on record which gives rise to crystals along its culture."[1]

I am indebted to Dr. James R. Hunt, interne of the Hospital of the University of Pennsylvania, for the notes of another unpublished case of considerable interest. The patient was under the care of Dr. John Ashhurst, Jr., in the surgical wards of the University Hospital, who has kindly permitted me to refer to the case in this connection.

The patient was a German laborer, twenty-six years of age, who presented a history of obscure renal disease extending over a period of six years. A distinct resistance was felt in the region of the right kidney, which was quite tender on pressure. The urine contained numerous

[1] The preparations and procedures necessary for a bacteriological examination of the brain have been kindly summarized for me by Dr. Ball. The materials necessary to be at hand are a platinum needle, clean scissors, three nutrient agar tubes, three nutrient gelatin tubes, three nutrient blood-serum tubes, three nutrient bouillon tubes, a one per cent. sublimate solution, and an alcohol lamp or Bunsen burner.

The precautions necessary are: 1, that the tissue must not be exposed longer than absolutely necessary; 2, the instruments and needles must be passed through flame before touching the tissue; 3, the tissue must be at once conveyed to the nutrient or medium, and in doing this every contamination must be avoided—the cotton plugs, for instance, when removed from the tubes must be singed before they are taken out, and before they are replaced; 4, if the nutrient material is fresh, one tube of each kind must be kept for control experiments; 5, have labels on the tubes so that they can be marked at once.

After the calvarium has been removed, wash the dura with the sublimate solution, then, with the scissors—which have been sterilized in the flame—lift off a small portion of the dura, and if any subdural fluid is present, with a sterilized ear-spoon, such as in ordinary use, obtain a few drops, and inoculate at once one of the bouillon tubes with it. Without much exposure snip off a piece of the cortex with the sterilized scissors, and drop it into the second bouillon tube, and likewise obtain a small piece for one agar and one blood-serum tube. If there is any inflammatory exudate, dip the sterilized platinum needle into it, and then quickly inoculate a gelatin tube by thrusting the needle into the gelatin and withdrawing it. A stroke culture can be obtained by smearing the top of the agar in one of the tubes with the infected needle. Open the ventricles carefully with a sterilized knife or scissors, and with the platinum needle looped, or with the ear-spoon, obtain a few drops for the inoculation of the third bouillon tube and one blood-serum tube. The other tubes can be reserved for different portions of the cerebrum.

After the tubes have been inoculated, place two bouillon and two agar and two blood-serum tubes in the inoculating-oven at 35° C., and watch developments. The other bouillon tube is left in the room at ordinary temperature, likewise with the gelatin and the other agar and blood-serum tubes. If a distinct microbe is determined, its nature must be studied by experiments on animals.

pus-cells, but no blood and no crystals. An exploratory operation was performed.

A needle was thrust into the kidney substance in various directions in search of a calculus, but with negative results. A large drainage-tube was placed in the wound, which was closed. The day following the operation the patient became unmanageable, tearing and displacing the dressings, and on one occasion, while unobserved, he tottered down the ward. Beginning a few hours after this, there was almost complete suppression of urine, lasting forty-eight hours; but under treatment the secretion was re-established for a period of twenty-four hours, which was followed again by almost complete suppression, which lasted until death. Examination of the dressings showed pus and urine. A urinary fistula was evidently present. The man was irrational immediately after the operation, and this state gradually merged into one of moderate delirium, which on the seventh day amounted to actual mania, this lasting until death, which occurred ten days after the operation. The autopsy was made by Dr. H. W. Cattell. The right kidney lay in a bed of foul-smelling somewhat greenish pus resembling tubercular sputum. On section the renal substance was found infiltrated with pus, with great destruction of its upper portion. The kidney was of the large white variety, and contained a large, rather friable calculus, a perfect mould of the pelvis, infundibuli, and calices. The right ureter was thickened, but otherwise normal; the left presented a hydronephrosis, and on closer examination a stone the size of a lima bean of medium size was found plugging it at the junction of its inner and middle third. Examination of the brain and meninges was negative, with the exception of a slight haziness of the pia and some turbidity of the fluid in the lateral ventricles.

Cultures made from the meninges were negative; but from the fluid found in the lateral ventricles a pure culture of the bacillus pyocyaneus was obtained. Cultures from the pus in and about the kidney contained yeast and pus organisms, but not the bacillus obtained from the ventricular fluid.

The toxæmias of pregnancy and the puerperal state which result in mental disorder cannot be passed by in a discussion of this subject; indeed, thoroughly studied, they might afford the best foundation upon which to build our discussion. Davis,[1] who has recently contributed a brief but valuable clinical paper on the toxæmia of pregnancy, believes that the mode of production of the toxine or poisonous waste which threatens pregnant women is not clearly explained; that while the usual metabolic processes account for a portion of the material present, a certain number of the cases point strongly to an acute inxtoxication due to the products of bacteria. In one of his cases in which marked toxæmia was present, the examination of the urine failed to reveal either casts, albumin, or marked deficiency in urea. Pronounced symptoms were present, as coronal and frontal headache and extreme restlessness and melancholia, greatly exceeding the usual timidity manifested by patients in the pregnant condition.

[1] Davis: AMER. JOURN. OF THE MED. SCI., Feb., 1894, vol. cvii. p. 147.

Tuke and Woodhead[1] believe that in puerperal insanity a considerable proportion of cases is due to toxic influences, for although a woman may become insane during her puerperal period, her case need not be referable primarily to childbirth. "However, the violent delirious mania which sometimes develops within fifteen days after delivery has all the aspect of toxic influences. The sudden inception, delirious character, rapid development, inflammatory complications, and tendency to death are eminently suggestive of septic origin. Such cases seldom present themselves later than a fortnight after childbirth (the period during which septic changes go on in the uterus), and more frequently they occur within ten days."

Olhausen,[2] in five and a quarter years, observed psychoses following eclampsia eleven times in two hundred cases. They occur early, seldom later than from two to four days, and are marked by constancy of hallucinations, rapid afebrile course, and generally favorable termination. They are doubtlessly intoxication-psychoses, closely related to uræmic changes in the blood. He suggests the following classification: 1. Psychoses directly due to febrile puerperal processes (infection-psychoses). 2. Idiopathic psychoses without bodily or febrile disease (lactation, acute anæmia). 3. Intoxication-psychoses, following eclampsia, or, exceptionally, uræmia without eclampsia.

While the mental disorders of the puerperium, like many other of its disastrous affections, are usually dependent upon the attendant and the surroundings of the puerperal woman, auto-infection has been claimed as an explanation of those cases which occur when every precaution has been taken. This question has been subjected to bacteriological investigation, especially by Williams,[3] who believes that the term auto-infection is not well chosen. Numerous careful bacteriological investigations have shown that the vaginal secretions of pregnant women are of two kinds—normal and pathological. The bacillus of the normal secretion is non-pathogenic, and, on the whole, is rather inimical to pus-producing organisms. In 10 per cent. of the cases with pathological vaginal secretion Döderlein[4] found the streptococcus pyogenes, which was demonstrated by inoculation experiments to be pathogenic in more than one-half of the cases, and these observations have been confirmed by Williams. The bacteria of puerperal infection, as summarized by Williams, are the streptococcus pyogenes, the staphylococcus aureus and albus, the gonococcus, and the colon bacillus. He holds that it is also quite probable that some of the putrefactive organisms play an important part in what Matthew Duncan has designated as sapræmia.

[1] Tuke and Woodhead: Tuke's Dict. Psych. Med., 1892, vol. ii. p. 911.
[2] Olhausen: Zeitschr. f. Geb., Bd. 21.
[3] Williams: AMER. JOURN. OF THE MED. SCI., July, 1893, vol. xvi. p 45.
[4] Döderlein: Das Scheidensekert und seine Bedeutung für das Puerperalfieber. Leipzig, 1892.

While, so far as I have been able to learn, no satisfactory bacteriological examination has been made in a case of puerperal mania, Kaltenbach[1] or rather Gerdes[2] under the direction of Kaltenbach, made an exact and exhaustive bacteriological examination of the organs of a woman who died of puerperal convulsions; and the results obtained in this investigation would have equal significance in the explanation of fatal puerperal mania. Cultures were made from the lungs, kidneys, liver, and the aortic blood, and in all cases a growth developed which consisted entirely of a pure culture of a very short, thick bacillus. Its culture showed certain characteristic peculiarities. Injections into mice proved rapidly fatal, clonic convulsions occurring in about an hour, followed by death in stupor from nine to twenty hours. Relatively large doses of morphine, administered previous to the injection of the culture, prevented the occurrence of convulsions and saved the life of the animals. This drug, however, only prevents the effect of the germ, and does not inhibit its multiplication in the body. The rat is quite refractory to this germ, needing large doses; rabbits, pigeons, and guinea-pigs are refractory. Gerdes suggests a very careful bacteriological examination of all fatal cases of puerperal eclampsia. In a later article, Gerdes[3] declares—1. That the eclampsia bacillus is the sole cause of puerperal eclampsia, and is found in no other disease, and there can be no eclampsia without its presence; and that the infection proceeds from the uterus, probably from an endometritis existing prior to conception. 2. That convulsions due to other causes, occurring during labor, are to be strictly separated, on the basis of the post-mortem appearances, from true puerperal eclampsia. 3. Eclampsia is a well-characterized disease, strictly limited anatomically. 4. The profound changes found in the organs of eclamptic patients post-mortem are not adequately explained by the demonstration of the presence of the specific germ in the body, but are probably due, directly or indirectly, to its toxines.

It must be noted, however, that several obstetricians and bacteriologists have reached different conclusions from Gerdes. Hofmeister, Hagler, and Döderlein agree in declaring that they have not been able to convince themselves that the bacillus found by Gerdes is the cause of eclampsia. Hergott made cultures from the organs in seven cases of eclampsia without results. From the urine he isolated a bacillus in five cases. This bacillus was not identical with that of Gerdes. It had some pathogenic action on pregnant rabbits, but Hergott believes that this is due to its action on the kidneys.[4]

[1] Kaltenbach; Wiener med. Blaett., 1892, No. 21. [2] Gerdes. Ibid, 1892.
[3] Gerdes: Deutsche med. Wochenschr., June 30, 1892, No. 26, p. 603.
[4] Wien. med. Wochenschr., 1893, No. 22. Cited in Rev. Insanity and Nerv. Dis., December, 1893, vol. iv. No. 2.

Conclusions may be drawn as follows:

1. Specific infection must be included among the causes of mental symptoms and diseases which precede, accompany, or follow febrile and other infectious disorders.

2. Much negative evidence can be adduced in favor of acute delirium or acute mania being due to toxæmia—such evidence as is afforded by autopsies which reveal neither gross nor histological lesions; and in these cases the toxæmia probably overwhelms the patient before the production of meningitis or other disease.

3. Analogies with nervous affections which are known or believed to be of microbic origin—such as multiple neuritis, myelitis, and chorea—favor the view that insanities with similar or related phenomena and lesions are also microbic in origin.

4. The evidence afforded by careful bacteriological investigation of cases of acute insanity is thus far meagre, and shows that various micro-organisms may induce the same or similar types of mental disease.

5. The mental disorders of pregnancy and the puerperal state are probably, in a considerable proportion of cases, toxæmic, without reference primarily to childbirth; but it cannot be regarded as proved that a bacillus of either eclampsia or puerperal mania is the sole cause of these affections.

A CONTRIBUTION TO THE LOCALIZATION OF THE MUSCULAR SENSE.

By Dr. M. Allen Starr,

and

Dr. A. J. McCosh,

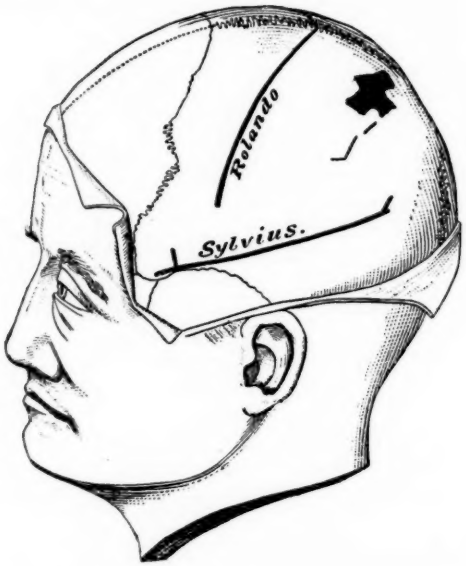
of New York.

There has been some discussion in regard to the existence of a muscular sense, or sense of the position of the limbs as derived from sensations arising in the surface, joints, and muscles, which can serve as a guide to movement. It has been claimed by some that a perception of movement is an inherent power of the motor area. It has been held by others that a muscular sense is separate from the voluntary motor function, and that it has a different cortical localization.

Without entering fully into this discussion, we desire to record the following very interesting case, which seems to give conclusive proof that the muscular sense has a localization of its own entirely independent of the motor impulse. The case is quite comparable to an accurate physiological experiment upon the cortex of the brain, although, as will

be evident to the reader, no such experiment was intended. We have not been able to find in the literature of the subject any similar case.

Traumatic epilepsy characterized by psychical attacks; headache; trephining; removal of small angioma; loss of muscular sense in the right arm, lasting six weeks; recovery.—S. F., aged twenty-one, is the son of healthy and intelligent parents, with a personal and family history free from any rheumatic or syphilitic taint or alcoholic habit. Up to his fifth year he was a bright and healthy child. He then received a severe fall on his head, followed by unconsciousness for twelve hours. Since that accident he never completely regained his mental balance, and has suffered from pain on the left side of his head. He seemed fairly bright



at his lessons, and was willing to study, but was very easily excited and accustomed to give way without adequate cause to emotional impulses, either of joy or anger. When sixteen years of age he received a second fall on his head, followed again by unconsciousness for several hours. Since the second accident all his symptoms have been decidedly aggravated. The headache is located by him in the left parietal and occipital regions, and the maximum point of pain seems to be at a point half-way from the parietal boss to the median line, and at this spot a small scar can be seen, and there can be felt a slight irregularity of the surface of the skull, suggestive of a fracture. The pain from which he suffered, though continuous, was subject to exacerbations. In connection with the sudden increase of pain, the boy would develop a maniacal condition, in which his actions were extravagant, his speech abusive and profane, and in which he at times indulged in acts of violence toward

his family and employers. In consequence of these attacks, which occurred every few days, or, when under treatment by bromides, every three or four weeks, he was unable to keep up with his classes at school or to pursue any steady employment.

He was not particularly bright or intelligent, though he could not be said in any sense to be demented. Between the attacks he had no clear recollection of what had occurred during an attack, and on several occasions he had lost consciousness; he had never had any convulsions. All remedies having failed to produce any relief of these distressing symptoms, it was thought justifiable to trephine him at the site of the pain. It was thought that in all probability there had been a fracture of the skull at the time of the fall and a local pachymeningitis beneath the fracture, as well as some injury of the brain substance. Very careful tests made before the operation failed to reveal any disturbance of the special senses or any disturbance of motion.

Operation, February 10, 1894. After reflection of the scalp flap, considerable thickening of the tissues was noticed, especially of the pericranium, which was very adherent to the skull. Directly under the cicatrix was a slight linear depression upon the surface of the bone. With an inch trephine a button of bone was removed, its centre being one and a quarter inches to the left of the median line, one and three-quarters inches behind the fissure of Rolando, and an inch above the parietal bone. There was no evidence of fracture on the inner table, and the dura mater appeared normal. The opening in the skull was enlarged by rongeur forceps. When the dura was incised and reflected there was no evidence of any internal pachymeningitis, but the surface of the brain and pia presented an abnormal appearance. A large number of veins of the pia mater appeared to be distended and increased in size, so that a vascular mass consisting exclusively of veins was present just under the trephine opening. This mass of veins, covering a space three-quarters of an inch in diameter, contrasted very markedly with the normal appearance of the pia at adjacent portions. The larger veins leading into this mass of vessels were tied with catgut, which was passed in a needle under the vessels, and probably at four points the superficial layer of the brain cortex was slightly lacerated by the passage of the needle and the tying of the ligature. The brain cortex about this mass appeared to be normal, but it was explored by the hypodermatic needle with a view of the possibility of finding some cyst beneath; nothing was found. The wound was then closed. Recovery from the surgical operation was steady and progressive. He was fit to be discharged from the hospital in ten days.

Immediately after the operation the boy noticed a peculiar awkwardness in his right hand and arm. When examined this was found to consist of a most pronounced condition of ataxia, all finer co-ordination of movement being impossible. Thus any attempt to grasp a pencil or a glass of water, or to pick up a pin, resulted in most excessive motions without the possibility of carrying out the desired movement; the attempt to place his finger upon his nose with his eyes closed failed, the finger frequently being carried up above the head or far to one side. When his eyes were closed he was absolutely unable to tell what position had

been given to his fingers or hand by the examiner. He did not know whether his hands were closed or opened. When his hand was placed in a position and he was requested to put the other hand in the same position, his eyes being shut, he was totally unable to do so. There was altogether a complete loss of muscular sense in the hand and wrist. At the same time his actual power was greater in the right hand than in the left; there was no disturbance whatever of tactile sense or the sensations of temperature and pain. There was no similar disturbance in the leg, and his gait was perfect; there was no affection of the face or the eyes. It was evident that the effect of the operation upon a spot in the brain about at the junction of the superior and inferior parietal convolutions, clearly posterior to the posterior central convolution, had resulted in a loss of muscular sense in the opposite hand and forearm without any disturbance of other sensations or of the power of movement.

This condition of ataxia remained stationary for about three weeks, and then gradually subsided. On April 10th, when he was last examined, no trace whatever remained, and the boy is practically well, being free from his old headache, feeling much brighter and more active, and having had no return of his attacks of epileptic nature.

TUBERCULOSIS OF THE FALLOPIAN TUBES.

(PRELIMINARY PAPER.)

By Charles B. Penrose, M.D.,

AND

H. D. Beyea, M.D.,

OF PHILADELPHIA.

We report the cases in this paper in detail, because we think that the frequency of genital tuberculosis in women is not generally recognized by the medical profession.

Much light has been thrown on that very large class of diseases called by the unscientific name of "pelvic inflammatory troubles" by the discovery of "unsuspected tuberculosis" of the Fallopian tubes, to which attention was first called by Williams, of Johns Hopkins Hospital.

The term unsuspected tuberculosis is applied to those cases of tuberculosis of the Fallopian tubes in which there is nothing in the objective symptoms and in the macroscopic appearance of the tubes, ovaries, or peritoneum to indicate the character of the disease. The tubes and ovaries present the same gross appearance which we see in more specific chronic salpingitis with adhesions; and it requires a microscopical and

bacteriological examination to determine that tuberculosis is the cause, or, at any rate, the accompaniment of the condition.

During the past winter we have made careful examination of all the Fallopian tubes which we have removed for any form of salpingitis. The total number of cases in which cœliotomy was done for salpingitis is twenty-five. In two of these cases the tuberculous character of the disease was manifest as soon as the abdomen was opened, from the presence of the tubercles upon the peritoneum of the tubes, uterus, intestines, etc. In three other cases the real nature of the disease was not suspected until a microscopical examination had been made of the tubes and the characteristic tubercular lesions and bacilli had been found. These three cases, therefore, belong to the class called unsuspected tuberculosis.

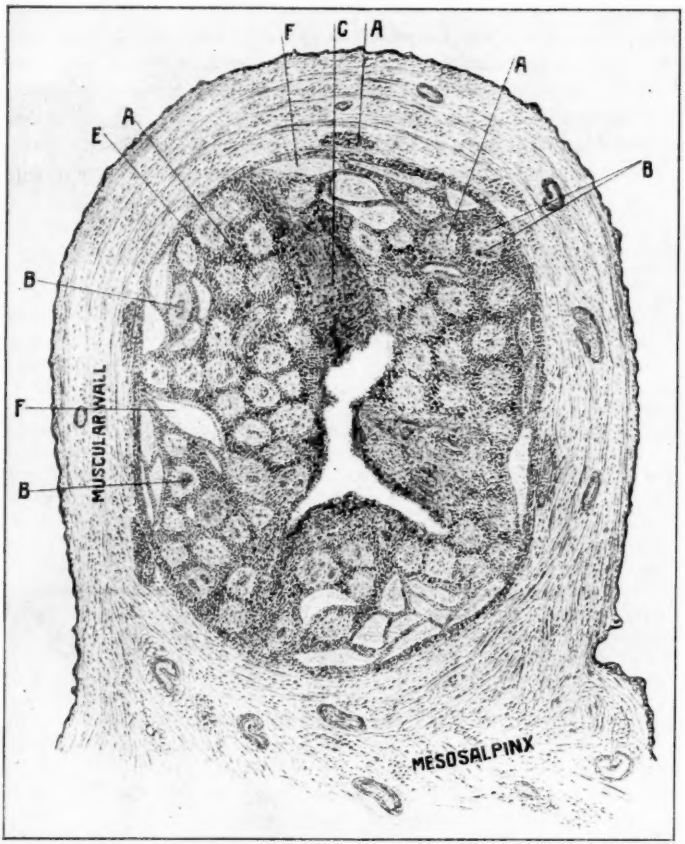
Case I.—R. W., American, white, thirty-six years of age, single, dressmaker, admitted to the University Hospital, November, 1893. Menstruation first appeared in the twelfth year, and until January, 1893, was always regular, occurring every three weeks, and lasting usually two to three days. From January until March, 1893, she had almost continuous uterine hemorrhage (every two to three days), but from this time until the 1st of September she missed her menstrual periods. September 1st she began to flow again, and at times the hemorrhage was so severe that she was confined to her bed; *i. e.*, she would have a pronounced hemorrhage every three weeks and a slightly colored discharge in the interval. About the middle of April, 1893, she began to complain of pain in the left iliac fossa, back, and thigh, and from April 15th until June 5th she was confined to her bed with severe pain in the left iliac fossa. For three weeks before admission she had less pain and was much more comfortable. In May she had an attack of acute cystitis, complaining of pain in the hypogastric region, and frequent and painful micturition; but after a month's treatment these symptoms nearly disappeared, though she continued to be troubled occasionally with frequent and painful micturition, particularly at night. She had severe headache at times, and on admission to the hospital was very anæmic. There was a slight leucorrhœa; the bowels were regular. The patient had always been delicate and unable to do hard work of any kind. She had had the usual diseases of childhood, scarlet fever, pneumonia when ten years of age, and typhoid fever four years ago. When a child, until fourteen years of age, she was much troubled with a hacking cough. Family history: Father and mother living. Mother has cerebral softening; father healthy. Five sisters and four brothers living. Two brothers unhealthy—one suffering with Bright's disease and the other with cardiac disease. Sisters are all delicate, one having had white swelling and necrosis of the femur.

Vaginal examination showed enlargement of the uterus and a small cystic mass in the left ovarian region. The uterine appendages were adherent. Streptococci were found in the vaginal discharge preceding the operation.

Cœliotomy, performed on November 23d. A cyst the size of a base-ball was found attached to the left ovary. Both tubes were closed, enlarged to the size of a small culture-tube, and universally adherent.

The uterus contained in its anterior wall a small submucous fibroid. Cyst, tubes, and ovaries were removed with considerable difficulty, the cyst being ruptured. Cover-glass preparations were made from the tube-contents during the operation, and no bacteria were found. No drain-

FIG. 1.



(CASE I.) A. Miliary tubercle. B. Giant-cell. C. Caseation. D. Abscess. E. Small round-cell infiltration. F. Cavities filled with degenerated pus.

age. Convalescence was uneventful, the temperature never going above 100° F., and being generally normal until December 6th, when the temperature rose to 102.6° F., the patient complaining of headache and feeling generally unwell. Blood was noticed in the urine several times after the operation, but no microscopical examination is recorded. The temperature remained irregular, with an evening rise and morning fall,

until February, when, on making a vaginal examination, an intra-uterine polyp, the size of a walnut, was found presenting through the external os. The polyp was removed, and convalescence proceeded without further symptoms until her discharge from the hospital, February 12th. The abdominal wound, after complete primary union, three weeks after operation, broke down, without marked suppuration, and healed very slowly by granulation. Examination of the blood December 4th, ten days after operation, showed the red blood-corpuscles to be reduced to 50 per cent.; hæmoglobin, to 45 per cent. January 4th: red blood-corpuscles, 80 per cent.; hæmoglobin, 75 per cent. February 5th: red blood-corpuscles, 95 per cent., and hæmoglobin, 70 per cent. She left the hospital greatly improved in health, the anæmia having nearly disappeared. A thorough physical examination of the chest was made several times during her treatment, with perfectly negative results, and no signs of tuberculosis were manifest anywhere.

Macroscopic Examination of Specimens. The specimens consisted of the tubes and ovaries from both sides, the cyst having been misplaced. The left tube was very tortuous, 10 cm. in length, and covered with dense adhesions destroying its peritoneum; it was generally enlarged, measuring 1.8–2 cm. in its outer third, 1.2 cm. in its middle third, and 1 cm. in its inner third. The abdominal ostium was closed. The tube was rather hard in consistence, and on section the muscular wall was seen to be greatly hypertrophied, particularly opposite to the attachment of the mesosalpinx, where in its outer third it measured 6 mm. The lumen was obliterated except in its outer third, where the tube was torn; here it contained a small amount of inspissated pus or caseous material. No signs of rugæ were noticed. Macroscopically no miliary tubercles could be seen either on the surface or in the sections. The mesosalpinx was completely obliterated, and the ovary was in immediate relation with the tube. The ovary had been considerably lacerated in its removal, and was covered with the same dense adhesions as the tube. It was soft in consistence and somewhat enlarged, measuring 5 x 4 cm. On section, few developing follicles were noticed. The right tube was about the same size and length as the left, covered with dense adhesions, was quite hard in consistence, but the tube lumen was intact. The abdominal ostium was closed, but had been extensively lacerated. The ovary was large and in every way similar to that of the opposite side. The mesosalpinx was also obliterated. No tubercles were detected either on the peritoneal surface of the tubes or ovaries or in making macroscopic sections. The polyp removed several weeks after the primary operation was the size of a walnut, very hard, and evidently fibroid in character.

Microscopic Examination of Specimens. Sections through the middle third of each tube show the entire mucous membrane to be infiltrated with innumerable miliary tubercles in all stages of development. The lumen of the right tube is patent, and the superficial mucous membrane shows marked caseation. A like condition presents itself on the left side, except that the lumen is obliterated in its inner two-thirds, and caseation is perhaps more marked. The greater number of the miliary tubercles present typical giant-cells, and many show beginning caseation; others are simple epithelioid-celled tubercles, giant-cells not having developed. Nowhere in the left tube, and only occasionally in the right tube, can the normal tubal columnar epithelium be found. Where columnar epithelium does exist it is always in relation with the muscular wall and

forms the wall of a cavity filled with partially degenerated pus. The greater number of tubercles are surrounded by an extensive small round-cell infiltration which is not infrequently converted into fibrous tissue. Just beneath the mucosa, separated from the muscular wall, and rarely in the muscular wall itself, very near its mucous-membrane margin, small multiple abscesses are sometimes seen surrounded by a marked small round-cell infiltration. The muscular wall is greatly hypertrophied and extensively infiltrated with small round cells. On the surface of both tubes and in all sections a chronic perisalpingitis is demonstrable. Sections through the outer ends of both tubes show caseation to be more marked, but otherwise do not differ from sections through the middle third. Sections made through the uterine ends show the process to be more acute, and almost no caseation can be seen. The tubercles have not reached the same degree of development as in other sections; one or more tubercles extensively surrounded by small round cells can be seen in the muscular wall, and most frequently opposite the attachment of the mesosalpinx. This condition is not found elsewhere. Small round-cell infiltration also seems to be generally more extensive in this portion of the tube. We, therefore, conclude that the disease began in the outer third of the tube. Sections made through the parovarium show the stroma to be intricately infiltrated with miliary tubercles, but caseation has not as yet taken place. The mesosalpinx contains a few tubercles, all being distant from the tube, the nearest being 5 cm. from its muscular wall. Both ovaries are about equally involved, the oöphoron and part of the paroöphoron being almost completely converted into tubercular tissue, and frequently large areas of caseation are seen. In many parts of the left ovary, in a single microscopic field a number of tubercles can be demonstrated in different stages of development, surrounded by small round cells which take the stain more deeply, and thus present a typical picture of tuberculosis. A large number of sections were stained for tubercle bacilli, and in several of these undoubted tubercle bacilli were found. Sections from the polyp show it to be a fibroid, but nothing characteristic of tuberculosis can be found on its surface. A few cover-glass preparations were made from the urine and vaginal discharge, but no bacilli were found. Although the tubercular infiltration extended to the uterine cornua on both sides, considering the fact that she had no symptoms, and at the time of discharge was rapidly improving in health, we conclude that the disease had not extended to the uterus. From the macroscopic appearances of these specimens we are quite positive in the opinion that tuberculosis could not have been suspected.

These specimens, therefore, present bilateral unsuspected miliary tubercular salpingitis, localized in the mucous membrane, except in the uterine end of the left tube, where tubercles infiltrate the muscular wall; chronic miliary tuberculosis of the ovaries, parovarium, and mesosalpinx, and a small submucous fibroid polyp of the uterus.

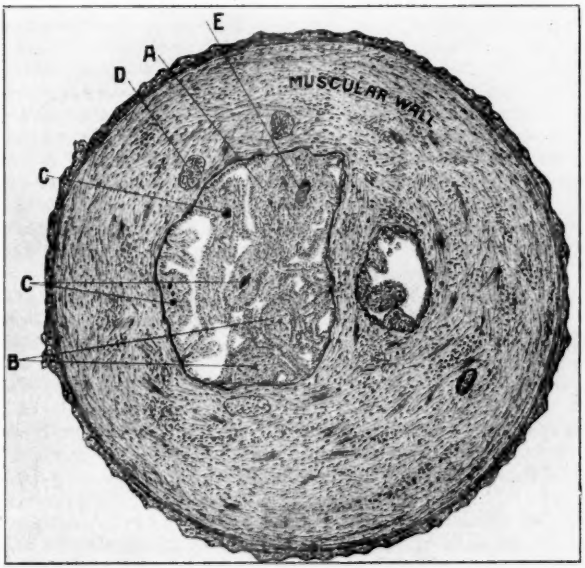
This woman is a very respectable person in whom we found no indication that sexual intercourse had been practised. This seems to be a case of primary chronic diffuse tuberculosis of the Fallopian tubes, the disease beginning in the outer parts of these structures.

Case II.—E. R., American, white, twenty-three years of age, married sixteen months, nullipara, no miscarriages. Menses first appeared at

seventeen years, regular, usually lasting seven days, never profuse, but often painful and confining her to bed for a day. She now complains of pain in the left iliac fossa and back. Bowels are regular. Before the present trouble she had always been healthy, except when at fourteen years of age she had a disease diagnosticated as gastric ulcer. The patient has lost much in flesh and strength, and now weighs ninety-two pounds. Family history is negative, except that a paternal aunt died of pulmonary tuberculosis. The symptoms were of such gradual appearance that she could not state when her sickness began. She was sick before marriage, and had become worse after marriage.

Patient's condition before operation: General physical weakness, backache, double ovarian pains.

FIG. 2.



(CASE II.) A. Epithelioid cell infiltration. B. Miliary tubercle. C. Calcification. D. Abscess. E. Giant-cell.

Vaginal examination showed retroflexed uterus, fundus adherent and small, very tender adherent tubes and ovaries.

Cœliotomy, performed November 27, 1893. The uterus was found sharply retroflexed; the tubes and ovaries were bound down by dense, firm adhesions. The appendages were removed on both sides and the abdomen closed without drainage.

Convalesence was uninterrupted. She rapidly gained in flesh and strength, and now weighs one hundred and five pounds. She, however, complains of slight pain in the right iliac fossa. A thorough physical examination reveals no signs of tuberculosis.

Macroscopic Examination of Specimens. They consist of tube and ovary from both sides.

The left tube was 7.5 cm. in length, covered with dense adhesions; it was about normal in size, measuring 5 and 7 mm. in its various diameters; and on section was very hard in consistence. The lumen was generally very small, and in many places was almost obliterated and the tube converted into a musculo-fibrous cord. The abdominal ostium was closed and the mesosalpinx much shortened.

The right tube was 8 cm. in length, also covered with dense organized adhesions, and the abdominal ostium was closed. The outer two-thirds of the tube was the seat of an old hæmatosalpinx. On section, the tube was exceedingly hard in consistence, and in the sections through the hæmatosalpinx small areas of calcification were frequently noticed. In many instances in the uterine end of the tube the lumen was the size of a pin-point or head, and often, particularly as the hæmatosalpinx was approached, no lumen could be found. The tube measured from 5 mm. in its proximal two thirds to 9 and 13 mm. in its distal two-thirds. The mesosalpinx was obliterated. The ovaries were small, covered with a few adhesions, and were the seat of a marked hydrops folliculi. They measured 2.5, 3.5, and 4 cm. in their various diameters. Nothing suggestive of tuberculosis was noticed in the macroscopic examination of these specimens.

Microscopic Examination of Specimens. Sections through all portions of the left tube show a much thickened musculo-fibrous wall occasionally infiltrated with small round cells, and as the tube lumen is approached a small miliary tubercle or a minute area of epithelioid cells infiltrating between muscular fibres may be seen. Muscular tissue is still predominant, but the entire tube is characteristically fibrous, the tubercles often being surrounded by a very few small round cells and much fibrous tissue. The mucous membrane is almost entirely destroyed and the lumen edges are composed of fibrous tissue. Where a portion of the rugæ still exists, covered with intact columnar epithelium, the stroma is infiltrated with a miliary tubercle which rarely contains a giant-cell and never shows any signs of beginning caseation. A few small abscesses are seen in the tube wall just beneath the destroyed mucous membrane. The tube is tubercular throughout, the process being, perhaps, most extensive in its outer third, but extending to within 1 cm. of the proximal end, where no tubercular tissue can be found.

Sections through the uterine third of the right tube show a condition almost identical with that of the opposite side, except that frequently the tube lumen is completely obliterated by fibrous tissue, and at other times it is divided into two portions by a band of fibrous tissue running transversely across the section. As the hæmatosalpinx is approached, minute foci of calcification are noted. Sections through the outer two-thirds of this tube or hæmatosalpinx show the lumen filled with degenerated blood, in the centre of which are large areas of calcification. The walls of the tube are here very narrow and are composed of fibrous tissue with an occasional minute miliary tubercle and area of calcification.

Sections through the parovarium show a few miliary tubercles containing either a small giant-cell, or a focus of calcification, or they are composed wholly of epithelioid cells. Several sections made through each ovary show them to be chiefly composed of follicular cysts, but no tubercular tissue can be found. Although twenty sections were stained

for tubercle bacilli and carefully examined, none could be found. These specimens, therefore, present universal fibrous tubercular salpingitis with calcareous degeneration in the right tube and parovarium, a hæmato-salpinx of the outer two-thirds of the right tube and simple hydrops folliculi of both ovaries.

This case seems to be one of primary chronic fibroid tuberculosis of the Fallopian tubes.

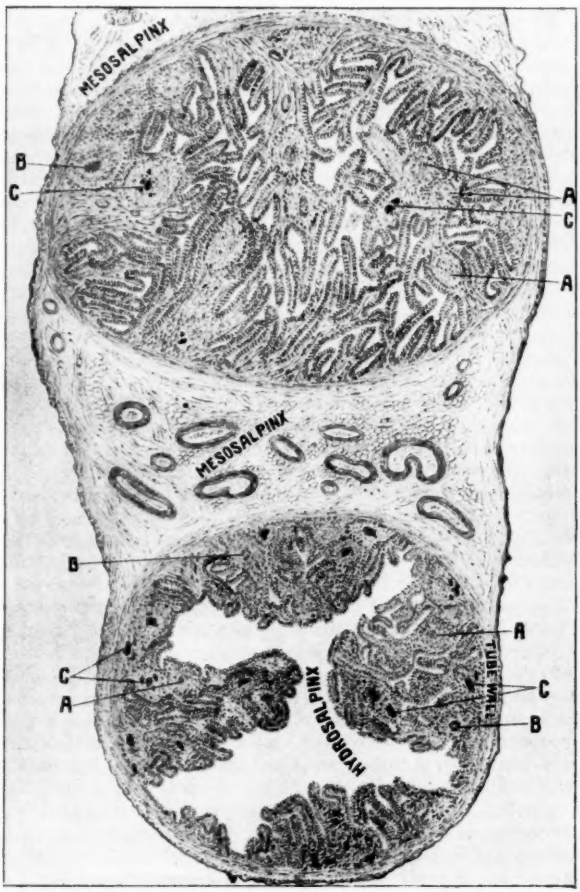
Case III.—E. P., American, white, thirty years of age, married three years, housewife, nullipara, no miscarriages. Menstruation first appeared in her sixteenth year, and has always been regular, lasting three days, never painful or profuse. Her present trouble began eight years ago with pain in the right iliac fossa and back. For a month preceding the appearance of this pain she had a profuse vaginal discharge and complained of frequent and painful micturition. The pain in the right iliac fossa and back continued up to the time of operation, being paroxysmal in character. The bowels had been regular; no leucorrhœa or urinary symptoms. Temperature, pulse, and respiration since admittance to the hospital had been normal. The patient was a small and poorly nourished woman. She had a history of having had some hip-joint trouble on the right side when a child. When admitted there was no ankylosis of the hip, but there was marked flatness of the right buttock as compared with the left, and asymmetry of the right side of the pelvis. We believe that she had had tuberculosis of the right hip-joint. Mother and father are living and well; two cousins died of phthisis. Her husband is a slight, delicate man and has had a cough for the last three years. He denies having had venereal disease of any kind.

Vaginal examination showed a cystic mass lying to the right and behind the uterus, and a diagnosis of broad-ligament cyst was made.

Cœliotomy, January 16th. The omentum was found adherent, covering the pelvic contents. The large intestine was attached by dense adhesions to the superior surface of the right broad ligament. A cyst the size of a fœtal head was found in the right iliac fossa, developing between the layers of the broad ligament and extending, adherent to all surrounding structures, to the hollow of the sacrum. It was enucleated with extreme difficulty, being ruptured in the procedure. About a pint of clear straw-colored fluid escaped from the cyst. On the left side the tube and ovary were much enlarged and generally adherent. The tube and ovary from the left side, and the cyst-wall and a mass of adhesions from the right side were removed. The right broad ligament was partially sutured. The site of the cyst was drained by a glass tube. Convalescence for ten days was uneventful, the temperature never going above 101.6° F., the drainage-tube being removed the second day following operation. January 26th the temperature became irregular, with an evening rise and morning fall, and she began to complain of pain externally over the right hip joint and the internal anterior surface of the knee-joint. The temperature from January 26th to March 10th was irregular, sometimes remaining about normal for four or five days, and then running up to about 102° F. She had continually complained of pain as described, but, except for this, her condition was markedly improved, all pelvic symptoms having disappeared. Vaginal examination showed firm adhesions on the right side, and the uterus small and in normal

position. A thorough physical examination of the chest had several times been made with negative result, and we believe that no tubercular lesion exists in the lungs. When discharged from the hospital, at the end of March, her temperature was continuously normal, and there were no indications whatever of any pelvic or abdominal trouble, though she still complained of some pain in the right hip and knee.

FIG. 3.



(CASE III.) A. Miliary tubercle. B. Giant cell. C. Calcification.

Six weeks after discharge she returned to the hospital complaining of great pain in the right hip, general physical weakness, and progressive emaciation. Vaginal examination was negative. There was no lateral

tenderness. There were firm adhesions in the region of the broad-ligament cyst. She had night-sweats, dry cough, and irregular temperature. There was marked pain on pressure and on motion in the rght hip-joint. We believe that active tuberculosis, latent or perhaps absent since childhood, has been re-established in the hip.

Macroscopic Examination of Specimens. The specimens consisted of tube and ovary from the left side and a mass of tissue from the right side composed of cyst-wall, a portion of a greatly lacerated and flattened ovary, the outer third of a tube, and a mass of old organized adhesions. The left tube was 11 cm. in length, greatly enlarged, particularly in its distal third, where it was dilated into a cyst, the abdominal ostium being closed. It was soft in consistence, appearing as a hydrosalpinx, and was covered with many dense adhesions, causing a partial constriction in its middle third. On section, a small amount of clear fluid escaped; and the lumen, except 5 cm. of its proximal end, was universally dilated, the dilatation being more marked as the abdominal ostium was approached, where it measured 1.2 cm. in diameter. The mucous membrane, except for the separation of rugæ, brought about through tubal dilatation, was apparently normal. The muscular wall was very thin, the maximum thickness being 1 mm. The tube was 1 and 1.8 cm. in diameter in the thinnest and thickest portions. The left ovary was 3.0, 3.5, and 4.5 cm. in its various diameters, covered with dense adhesions and the seat of a very marked hydrops folliculi. It contained a recent blood-clot 1.5 and 2 cm. in diameter. The mesosalpinx was completely obliterated and the ovary was in immediate relation with the tube. No miliary tubercles were noticed on the surface or in section of either tube or ovary. *Right side:* The remaining outer third of the tube, the remnant of ovarian tissue and the cyst-wall were enveloped and separated from each other by a mass of very dense adhesions. The tube was 3 cm. in length, 7 mm. in diameter, stony hard in consistence, and on section the lumen was obliterated. The inferior surface of the ovary was destroyed, and the cyst possibly had developed from its surface. It contained a large number of small follicular cysts. The cyst-wall was thin, smooth on its inner surface, and from its position nothing regarding its origin could be definitely ascertained.

Microscopic Examination of Specimens. Left side: Sections made through the proximal and middle thirds of the tube show chronic fibroid tuberculosis, localized wholly in the mucous membrane of a greatly dilated tube or hydrosalpinx. The mucous membrane rugæ are separated, and the stroma is at intervals infiltrated with a miliary tubercle or a few epithelioid cells. The miliary tubercle infiltration is distributed over areas separated by what would be normal mucous membrane except for considerable connective tissue hypertrophy and occasional slight small round-cell infiltration of the stroma; many microscopic fields can be seen without a single miliary tubercle or the least epithelioid-cell infiltration. The tubal columnar epithelium is completely intact in all portions of the section and in all sections. The miliary tubercles always infiltrate the mucous membrane stroma, and are very small as compared with those seen in Case I.; the greater number of the tubercles, perhaps nine-tenths, are composed simply of epithelioid cells; they take the stain very poorly, are characteristically fibrous, and are surrounded by exceptionally few small round cells. Giant-cells are remarkably few in number, and are also very small; never more than one

being found in a single tubercle, and none show beginning liquefaction necrosis. Occasionally, distributed over all portions of the mucous membrane but particularly as the muscular wall is approached, minute foci of calcification may be seen in a partly or completely destroyed miliary tubercle. The muscular wall is very much narrowed, muscular fibres are frequently infiltrated with fibrous tissue, but no tubercular tissue or small round-cell infiltration can be found in any section. The peritoneal covering of the tube is evidently destroyed, and its place is taken by an irregular layer of fibrous tissue. Sections through the outer portion of the middle third of the tube include a greatly enlarged parovarium which macroscopically resembles a tube, and is almost one-third larger than the tube itself, measuring 1.5 cm. in diameter. Microscopically the parovarium is infiltrated with fibroid miliary tubercles, localized in areas and presenting the same characteristics as those seen in the corresponding portion of the tube. The columnar epithelium is intact. Calcification is not so frequent as in the tube, but otherwise the disease is equally advanced. Sections from the abdominal third of the tube show dilatation much more marked, the muscular wall narrowed, and the lumen much larger than in other parts of the tube. The number of tubercles is greatly increased in this third of the tube, the stroma of the mucous membrane being much more extensively infiltrated with the same form of tubercular tissue. It is, therefore, noticeable that the tubercular process becomes continually more extensive as the abdominal ostium is reached. No areas of distinct caseation can be found anywhere. The mesosalpinx is not involved. Sections through the ovary show it to contain a large number of follicular cysts and a corpus luteum composed of degenerated blood, but nowhere in several sections made from this ovary can tubercular tissue be found. *Right side:* Sections through the remaining portion of the tube show the lumen almost obliterated, the mucous membrane destroyed, and the tube wall composed of fibrous tissue. Sections through the lacerated ovarian tissue show many follicular cysts and a few developing follicles. The cyst wall is composed of fibrous tissue, the lining cells, if any, having been destroyed. Fifteen sections from the left tube were stained for tubercle bacilli and three typical undoubted bacilli were found. All three bacilli were found in simple epithelioid tubercles.

These specimens, therefore, present chronic fibroid tubercular salpingitis, or hydrosalpinx, with calcification of the left tube, the disease being most marked in the distal third; chronic fibroid tuberculosis of a greatly enlarged parovarium, also with calcification, but less marked; chronic perisalpingitis and periovaritis of the left side; chronic inflammation and hydrops folliculi of both ovaries, most marked on the right side; chronic fibrous salpingitis and a cyst of unknown origin of the same side. That the specimens from the right side were primarily tubercular we cannot say, as nothing characteristic of tuberculosis was found; but since this disease frequently terminates in fibrous tissue, and the disease of the opposite side was of the fibroid form, we believe tuberculosis best explains the condition found. That tuberculosis could not have been suspected from the macroscopic appearances of these specimens we think is self-evident.

The case is probably one of secondary chronic fibroid tuberculosis of the Fallopian tubes, the primary lesion existing in the right hip-joint.

CASE IV.—Admitted to hospital March 30, 1894. Mrs. G., American, white, forty years of age; married; housewife; nullipara, no miscarriages. Menstruation first appeared when she was thirteen years of age, and until two months before her admission to the hospital had always been regular, lasting two to three days, and occurring every four weeks. It then became irregular, occurring every three weeks, and continued five to six days. One month before the change in menstruation she began to have pain in both iliac fossæ, and experienced bearing-down sensations. The pain became progressively more severe, and continued up to the time of operation, being most severe during the menstrual period and when in the recumbent position. She has been constipated for the past three months, or since the appearance of the first symptoms, and defecation has been associated with considerable pain and feeling of obstruction. She has never had leucorrhœa; there were no urinary symptoms. Temperature, pulse, and respiration for twenty-two days preceding operation were normal. The patient is a well-nourished woman, weighing about one hundred and twenty pounds, and, except for the diseases of childhood and dyspepsia several years ago, has been perfectly healthy. Her mother and father are living and well. Her husband is healthy. Two sisters died in confinement. Six sisters and one brother are living. One sister has a uterine fibroma and dyspepsia, and another has had a cough since childhood. The others are healthy. An uncle died of consumption.

A careful physical examination revealed no signs of tubercular trouble. Vaginal examination revealed a hard mass, about the size of a base-ball, behind and to the left of the uterus. The uterus was normal in size, and was adherent to the mass. Abdominal examination was negative.

Cœliotomy, April 20, 1894. The omentum and parietal peritoneum were seen to be occasionally studded with miliary tubercles, which were very small, transparent, and evidently of recent formation. The number of miliary tubercles progressively increased as the pelvis was reached, and were most numerous in relation with the site of the left uterine appendage. The omentum was adherent over the bladder and fundus of the uterus, the rectum adherent to the fundus of the uterus, and the vermiform appendix was attached by a strong band of adhesion to the right ovary. The right ovary and tube were apparently normal, the abdominal ostium of the tube being patent. The left ovary and tube were imbedded in a mass of adhesions behind the uterus. This mass was the size of a base-ball, quite as hard as a fibroid tumor in consistence; it completely filled Douglas' pouch, and extended, adherent to all surrounding structures, well down toward the left ischio-rectal fossa. The peritoneal cavity contained no fluid. It was quite evident that the disease originated in the left uterine appendage, as miliary tubercles were much more numerous on the left side, and in the pelvis they seemed to be larger in size and were here opaque. The mesenteric and pelvic lymphatic glands were but slightly, if at all, enlarged. The removal of the mass of tuberculous tissue was considered to be impossible, and, therefore, after irrigating with distilled water and introducing two strips of gauze to the floor of the pelvis as a means of drainage, the abdomen was closed. Convalescence was uninterrupted, the temperature, pulse, and respiration reaching normal on the fourth day after operation, and they have since continued normal and regular. Since

the operation the patient has complained of some soreness over the tract of drainage, pain in the left iliac fossa, and slight pain in defecation and micturition. Her appetite has improved; she has gained a little in weight and strength, and on leaving the hospital, one month after operation, believed herself well.

Macroscopic Examination of Specimen. The specimen was a small portion of the great omentum, removed for the purpose of microscopic examination. Its surface was studded with a few miliary tubercles, which were small, measuring 1 to 1½ mm. in diameter, and transparent, and could scarcely be recognized with the naked eye. They were discrete, slightly raised above the surface, and separated from each other by 1 to 2.5 cm. of apparently normal peritoneum.

Microscopic Examination of Specimen. The miliary tubercles were separately excised, hardened in absolute alcohol, imbedded in celloidin, and stained with Delafield's hæmatoxylin and eosin. Each miliary tubercle is found to be composed of three, four, or six minute tubercles, the greater number of which contain a typical giant-cell, with an unusual number of central nuclei. The giant-cells are surrounded by a large number of epithelioid cells, a small amount of connective tissue, and a few small round cells. No tubercle bacilli are found, yet the tissue described could only be characteristic of tuberculosis.

Since the miliary tubercles were discrete and transparent, the giant-cell nuclei numerous and always occupying the centre of the cell, and the connective tissue and small round-cell infiltration not marked, we conclude that the peritonitis must have been in an early formative stage and of short duration. Although microscopic examination of the left Fallopian tube was impossible, yet from the macroscopic appearance during the operation, considering the fact that it was very hard in consistence, and covered with dense fibrous adhesions, that the developing peritonitis was of undoubted tuberculous origin, as shown by microscopic examination, and that the mesenteric and pelvic lymphatic glands were not enlarged, and no other tubercular lesion could be found, we believe it evident that this case represents an instance of primary tuberculosis of the female genital organs, most probably of the left Fallopian tube, with secondary tubercular infection of the peritoneum.

Case V.—M. H., American, white, thirty years of age, married six years, tailoress; nullipara, no miscarriages. Menstruation first appeared in her sixteenth year, and has always been regular, lasting three to four days, but usually preceded by pain. Six and a half years ago, while working hard on a farm, she first noticed that she was losing in flesh and strength, and six years ago, or immediately after her marriage, without any apparent cause, she began to have pain in the right iliac fossa and back, referred down the right thigh. The pain was always worse during the menstrual period, and, with a gradual loss of flesh and strength, increased somewhat in intensity, although it was never very severe until her admission to the University Hospital, May 1, 1894. She has had leucorrhœa for many years. She is usually constipated, and is sometimes troubled with painful micturition. On admission to the hospital she was anæmic, and complained of pain as described. Temperature 99° F., pulse 80, respirations 22. She has had the usual diseases of childhood, including scarlet fever and a mild attack of pleurisy about six years ago, but otherwise has been perfectly healthy and able to do hard work, either on a farm or at her trade. Father and

mother are living and well. One brother died of typhoid fever. Four sisters and two brothers are living—one brother now has consumption, the others are healthy. Her husband is apparently healthy.

On vaginal examination the uterus was found small and retroflexed, the right ovary enlarged and adherent to the right uterine cornu.

Cœliotomy, May 4, 1894. The omentum was adherent to the parietal peritoneum on the right side of the abdominal incision. The intestines, omentum, parietal peritoneum, broad ligaments, bladder, and uterus were seen to be uniformly studded with numerous discrete opaque or transparent miliary tubercles about the size of a millet-seed, evidently of recent formation. The peritoneal cavity contained no fluid. The right tube and ovary were found covered with dense adhesions and miliary tubercles, and adherent to all surrounding structures. The left broad ligament was very short and inclined downward. The left tube was small, almost uniform in diameter from the proximal to the distal end, and terminated very near the pelvic wall in a closed end. In the operation it was necessary to include the distal portion of the tube in the ligature of the ovarian artery; no left ovary could be found. There were no signs of inflammation on the left side of the pelvis. There seems to have been congenital absence of the ovary with malformation of the tube. The right ovary and tube were dissected away with considerable difficulty, and removed with the uterus and part of the left tube. The abdominal cavity was closed without irrigation or drainage. Although convalescence was slow it was uneventful, except that the temperature reached 102.4° F. on the third day following the operation, and remained continually and regularly high until the ninth day, when it reached normal, but has been somewhat irregular since. The pulse remained about normal, the greatest rapidity being 90, when the temperature was 102.4° F. The patient left her bed at the end of the third week. She still complains of some pain in the right iliac fossa and back, but is otherwise slowly improving. Examination of the blood three weeks after operation showed the number of red blood-corpuscles to be 95 per cent. and the hæmoglobin to be 70 per cent. A thorough physical examination revealed a small area of impaired percussion-resonance over the base of the right lung, the probable result of an old pleurisy, but no signs of tuberculosis could be found anywhere.

Macroscopic Examination of Specimens. The specimens consisted of the tube and ovary from the right side, the fundus and supra-vaginal portion of the cervix of the uterus, and a portion of the left tube. All specimens and all portions of each specimen were covered with numerous miliary tubercles, which were generally somewhat larger than a millet-seed, and transparent or opaque. The right tube was 9 cm. in length, and covered with dense adhesions. The fimbriated extremity was lacerated, the abdominal ostium closed, and no signs of fimbria could be seen. The distal two-thirds was very much enlarged, measuring 1, 1.5, and 2 cm. in diameter, almost stony hard in consistence, and seemed to be composed of nodules or tubercles the size of a pea. The enlargement began almost abruptly at the junction of the middle and proximal thirds, and gradually increased as the fimbriated extremity was reached. The proximal third of the tube was of uniform and normal size, measuring 5 cm. in diameter, and was also very hard in consistence. On section, the distal two-thirds was seen to be composed of fibrous tissues arranged in the form of nodules or tubercles; the tube was patulous in the middle

third, the proximal half of which contained a small amount of inspissated pus or caseous material, and the distal half a small focus of coagulated blood. The lumen was obliterated in the distal third. The proximal third of the tube showed nothing abnormal except that the muscular wall was unusually resisting. The lumen was very small, but patent. No tubercles showed any signs of caseation, and no caseation was seen except in the lumen of the proximal half of the middle third. It was evident from the macroscopic appearances of the distal two-thirds of this tube that it was the seat of chronic fibroid tuberculosis. The mesosalpinx was but little shortened, covered with a few dense adhesions in relation with the tube, and contained a nodule 1.5 cm. in length which could be rolled between the fingers, and was considered to be an enlarged parovarium. The ovary was enlarged, measuring 4, 3.5, and 2 cm. in its various diameters, rather soft in consistence, covered with a few dense adhesions on its inferior surface, and was the seat of an extensive hydrops folliculi, many of the cysts containing blood. The uterus was very small, measuring 5 cm. in length, 5 cm. in breadth at the fundus, and 3.5 cm. at the cervix. Its peritoneal surface, except for miliary tubercles, was smooth and normal. The fundus was of about normal consistence, and the cervix hard and resisting. On section, the muscular wall appeared normal, the uterine mucous membrane was hemorrhagic, distinctly thickened, measuring 4 and 5 cm. in various portions of the fundus, and numerous minute tubercles could be seen and felt slightly raised above the surface. The Nabothian glands were prominent. The entire mucous membrane was the seat of a very chronic endometritis. The remaining portion of the left tube was 3 cm. in length, 5 cm. in diameter, abnormally hard in consistency, and its lumen, though exceedingly small, was patent.

Microscopic Examination of Specimens. Right side: Sections made through the *distal two-thirds* show chronic fibroid tuberculosis involving and almost completely destroying the mucous membrane, and infiltrating and distorting the muscular wall at short intervals. The disease is most extensive toward the centre of the tube, and becomes less and less marked as the destroyed peritoneal surface is approached. The mucous-membrane stroma in the distal third of the tube has been destroyed and replaced by tubercular tissue; and only occasionally, and always in relation with the muscular wall, can mucous-membrane stroma surrounded by its columnar epithelial cells be seen. The areas of this partially diseased stroma become more frequent toward the proximal third of the tube. A few fibres of stroma are very often seen separated and surrounded by tubercular tissue away from the muscular wall and in the centre of the tube in all sections. The columnar epithelial cells are always small in size, and are not only seen in relation with the muscular wall, but also partially or completely surrounded by miliary tubercles, or they appear as the end of a separated ruga in the centre of the tube. Where mucous membrane stroma still exists surrounded by its columnar epithelium, it forms the walls of numerous cavities containing either degenerated blood or a small amount of inspissated pus. The miliary tubercles are almost entirely composed of epithelial cells, which take the hæmatoxylin stain unusually poorly. The tubercular tissue is not only found as distinct miliary tubercles, but more frequently epithelioid cells and a few small round cells replace the stroma of a completely or partially destroyed ruga, separated from like

rugæ by a few columnar epithelial cells. The small round-cell infiltration is exceedingly small in amount, is not arranged around tubercles, but is uniformly distributed in every part of the tubercular tissue. Considerable fibrous tissue can be seen surrounding each tubercle and infiltrating tubercular tissue. Giant-cells are very rarely seen, the greater number of tubercles being composed of simple epithelioid cells and a few small round cells. The giant-cells are very large, occupying the greater part of the tubercle, and usually contain many central nuclei. They are most frequently seen in tubercles near or just within the muscular wall. One or two minute foci of calcification may be seen in every section. Sections through the *middle third* of the tube show the lumen to be present and its edges composed of tissue undergoing caseation. The lumen is largest in the distal half of the middle third of the tube and contains a small amount of blood. In the proximal half of the middle third the lumen is partially filled with inspissated pus or caseous material. The lumen is entirely obliterated in the distal third of the tube. The tube wall is very much hypertrophied, particularly in the distal third. It is the seat of an extensive and irregularly distributed small round-cell infiltration, and frequently, particularly near the mucous membrane edge, a large miliary tubercle is seen, surrounded by numerous small round cells. The most pronounced tubercular infiltration of the tube-wall is seen in the middle third, and here also an occasional large area of caseation with beginning liquefaction necrosis can be seen. These areas of caseation are very near the surface of the tube, and are covered with a thin layer of fibrous tissue. It therefore seems very probable that the peritoneum was infected from the middle third of the tube. The *proximal third* of the tube: Sections through this portion of the tube show the mucous membrane to be infiltrated with a few miliary tubercles, surrounded by and containing distinctly more small round cells than those of the distal two-thirds of the tube, but as the proximal half of this third is approached, all tubercular tissue disappears and only the least amount of small round-cell infiltration can be seen. In other words, the tube is almost normal in the half toward the uterine cornu.

Small round-cell infiltration is frequent in the tube-wall toward the middle third of the tube, but contains no tubercular tissue. The tubercular disease is, therefore, almost wholly localized to the distal two-thirds of this tube. Sections made through the middle third of the tube include the parovarium, mesosalpinx, and a small portion of ovarian tissue. The parovarium is enlarged, and the stroma is in many places infiltrated with fibroid miliary tubercles having the same characteristics as those seen in the corresponding portions of the tube, except that small round-cell infiltration is much more marked. Much of the parovarium stroma is normal, and surrounded by intact columnar epithelial cells, the tubercular disease being limited to small areas. The mesosalpinx, except for a slight small round-cell infiltration in that portion near the tube, and an occasional acute miliary tubercle and a small amount of fibrous tissue on its surface, is normal. No miliary tubercles can be seen in the mesosalpinx.

The portion of *ovarian tissue* is normal. Several sections made through the ovary show it to be covered with a capsule of dense fibrous tissue. The oöphoron contains a large number of small cysts, many of which are filled with degenerated blood—hydrops folliculi. One section shows a single acute miliary tubercle on the surface of the ovary,

but otherwise no tubercular tissue can be found anywhere in any section. Thus, the ovary is not included in the primary tubercular process.

Left side: Sections made through the remaining 3 cm. of the tube show nothing abnormal.

The uterus: Sections were made through its entire length from the supra-vaginal portion of the cervix to the peritoneal surface at the fundus, including endometrium, muscular wall, and peritoneal covering. Some were made in relation with each cornu. These show the endometrium to be much thickened because of a chronic glandular endometritis, and frequently in that portion toward the fundus, and particularly in each uterine cornu, small areas of miliary tubercular infiltration are seen. The infiltration always involves the superficial portion of the endometrium; it is localized to small areas composed of one or two, to six, minute miliary tubercles very extensively surrounded by a small round-cell infiltration. These tubercular areas become larger and more frequent toward the fundus, and particularly in the right uterine cornu. In the endometrium, away from the fundus, they are small, composed of a single miliary tubercle surrounded by an extensive small round-cell infiltration, and none can be found in the lower half and cervix. The small round-cell infiltration is so very extensive that it is easily recognized; where no tubercles seem to exist an area of small round-cell infiltration is often demonstrable. An excessive number of small round cells and no inter-cellular substance is seen. The miliary tubercles, except for the extensive small round-cell infiltration, do not seem to differ from those seen in the right tube. Giant-cells are not more frequent, and have the same characteristics. No caseation or calcification can be seen. Sections made transversely across each uterine cornu show the disease occasionally infiltrating the endometrium as a single miliary tubercle, but as the tube is approached they disappear. Miliary tubercles are more frequently seen in sections in relation with and through the right uterine cornu than in those through the left cornu. The glandular spaces throughout the endometrium are abnormally large, and the gland-cells are very often separated or have entirely disappeared. The stroma, except where miliary tubercles exist, is small in amount, the endometrium being mostly composed of partially destroyed utricular glands. The Nabothian glands are very large, and filled with a material which takes the stain poorly. The muscular wall and peritoneal covering seem normal. None of the sections included an acute miliary tubercle.

The uterus, therefore, shows chronic glandular corporeal endometritis and chronic cervical endometritis, with discrete miliary tubercular (most probably fibroid in character) infiltration of the upper half of the corporeal endometrium; also that the tubercular infiltration was most extensive in relation with the uterine cornua, particularly the right; that it becomes less frequent toward, and entirely disappeared in, the lower half of the corporeal endometrium, and that it also disappeared within each uterine cornu. That the endometrium was secondarily infected from the distal two-thirds of the right tube is beyond doubt, since the disease in these portions of the tube was more extensive, was chronic, and the lumen contained caseous material. Six sections made through the distal two-thirds of the tube were stained for tubercle bacilli and five typical bacilli were found. The fact that the disease of the right tube was almost entirely localized to its distal two-thirds is of particular interest, showing that primary infection, as is believed by all

observers, must have taken place in this portion of the tube, and, because of the normal more intricate folding of the mucous membrane, thus affording better conditions and protection for the growth of the tubercle bacillus. Why the proximal third of the tube was not secondarily more extensively affected we do not know; but this fact, with the secondary infection of the endometrium, which infection disappeared within the uterine cornua, demonstrates that, although sections through the last centimetre of the uterine end of the tube show no tubercular infiltration, the endometrium may be the seat of secondary infection. From the macroscopic and microscopic examinations of these specimens showing a very chronic and extensive form of fibroid tuberculosis of the right tube, and from the more extensive fibroid tubercular infiltration and areas of caseation in the wall of the middle third of the tube, we believe that the peritoneum was secondarily infected from this portion of the right tube.

These specimens, therefore, present: Chronic primary fibroid tubercular salpingitis, with calcification, of the right tube, the disease being almost wholly localized in the distal two-thirds; chronic secondary fibroid tuberculosis of an enlarged parovarium; chronic perisalpingitis of the right side; chronic inflammation and hydrops folliculi of a single (right) ovary; secondary fibroid tuberculosis of the upper half of the uterine endometrium, with chronic glandular corporeal endometritis and chronic cervical endometritis; and acute secondary tubercular peritonitis.

In none of the cases here reported was tuberculosis suspected. In the last two cases the condition was recognized as soon as the peritoneum was opened. In the first three cases the condition was impossible to recognize until the specimens removed had been subjected to microscopic examination. Without this examination the cases would have gone on record with the usual diagnosis of "adherent tubes and ovaries."

Cases I., II., and IV. seem to belong to the class of primary tuberculosis of the tubes, since no tubercular lesion could be found elsewhere; there was no history of any previous tubercular trouble; and in I. and II. marked improvement in the general health followed the operation.

In Case III. we believe the tubal trouble to be secondary to old tubercular disease of the hip.

In Case V. there is some little doubt about the primary character of the tubal tuberculosis, on account of the history of pleurisy, and from the fact that examination of the chest was not altogether negative.

There was nothing in the symptoms presented by any of the cases to indicate that tuberculosis of the tubes or of the peritoneum existed; nor was anything elicited by a bimanual examination of the pelvis which enabled us to make a diagnosis other than that of adherent tubes and ovaries. When tubercles exist on the peritoneum of the fundus and posterior surface of the uterus, we believe that a diagnosis can be made by dragging down the uterus with a tenaculum and examining per rectum. If this method of examination had been followed in Case V. we feel confident that tuberculosis could have been diagnosticated.

One point which strikes us in reviewing the histories of these cases is that all the women had been sterile, though four were married. In this respect these histories differ from those of ordinary cases of non-tubercular salpingitis, where in the great majority there is a history of at least one child or miscarriage before the disease reaches such a stage as to render the woman sterile.

The account of the beginning of the disease is too vague in all the cases for us to determine the time with any degree of certainty. From the fact of sterility, however, we conclude that tubal disease existed before marriage, either as tubercular or as a preceding inflammatory condition. We cannot determine certainly in any case whether tuberculosis existed primarily, or whether tuberculosis was grafted upon a pre-existing salpingitis. We think, however, that tuberculosis was the primary tubal lesion, at least, in the cases of the married women.

The common causes of non-tubercular salpingitis occur after marriage—sepsis and gonorrhœa; and in the disease from each of these causes one or more pregnancies may occur. No such history, however, is given by the cases which we have reported. Sterility existed from the beginning, and the disease seems to have antedated marriage.

We have stated that the five cases reported were found in a series of twenty-five cœliotomies for pelvic inflammatory trouble. Therefore, our results show that about 20 per cent. of such cases are tubercular in character, and that 12 per cent. of them belong to the class of cases called unsuspected tuberculosis of the Fallopian tubes. The total number of cases is too small to warrant the conclusion that 20 per cent. represents at all accurately the proportion of tubercular to non-tubercular cases of salpingitis. We believe that it is the largest per cent. which has been recorded; Williams reports 7.7 per cent. of tuberculosis in ninety-one cases of perisalpingo-oöphoritis.

From a pathological standpoint these cases are divided into: First. Primary chronic diffuse tubercular salpingitis (Case I.). Second. Primary chronic fibroid tubercular salpingitis with calcification (Case II.) Third. Secondary tubercular peritonitis, the primary lesion being in the Fallopian tube (Cases IV. and V.). Fourth. Secondary chronic fibroid tubercular salpingitis with calcification (Case III.). The characteristics of the first are that the mucous membrane is partially or completely replaced by innumerable miliary turbercles surrounded by an extensive small round-cell infiltration, and that large areas of caseation are very frequently seen. Caseation becomes more marked as the lumen and the distal two-thirds of the tube are approached. The muscular wall of the tube may be infiltrated to a greater or less degree. This form would represent tubercular pyosalpinx. The second form differs from the first in that considerable fibrous tissue is seen within and around the tubercles, and that small round-cell infiltration is very small

in amount and uniformly distributed in all parts of the tubercular tissue; also, that caseation is very rarely seen or is absent, and calcification very frequently occurs. The disease in this form may be limited to a portion of the tube, as in Case V. The characteristics of the third form are apparent and well known. The fourth form does not differ pathologically from the second. The specimens from four of the cases consisted of one or both tubes and ovaries, and in one case the uterus. In two of the four cases the tubercular salpingitis was bilateral. The ovaries were involved by the tubercular process in only one case. In the only instance where the uterus constituted part of the specimens it was the seat of chronic fibroid tubercular endometritis. This form of tubercular disease of the uterus is mentioned as being possible by Williams, but he reports no case. In all four cases the parovarium was affected by the tubercular process. As far as we can learn, tuberculosis of the parovarium has never been mentioned. As regards these four cases, the order of frequency of tuberculosis in the female genital tract is as follows: tubes, parovarium, uterus, ovaries. Case V. is interesting in that the peritoneum was infected from a chronic fibroid tubercular salpingitis, giving an instance where this form of tuberculosis was not a conservative process. Considering the frequency of unsuspected and suspected primary tuberculosis of the female genital tract and its termination in tubercular peritonitis, as shown by Williams and in this paper, it seems to us very probable that tubercular peritonitis in women has its origin in the female genital tract far more frequently than statistics show and is generally supposed. Should all organs found to be tubercular at autopsies on women dying of tubercular peritonitis be subjected to microscopic examination, thus determining which one of the lesions were the more chronic, we believe much would be learned.

THE NATURE AND TREATMENT OF LEPROSY.[1]

By R. H. L. BIBB, M.D.,
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ALTHOUGH it has been confounded with many affections of the skin, and known by a variety of names, history teaches that, since Moses wrote of "the laws and tokens whereby the priest is to be guided in discerning the leprosy," this vile disease, this unclean scourge has appeared, in a greater or lesser degree, among all nations and conditions of people—mid polar snows and equatorial sands; from the Orient unto the Occident.

It is not, however, the purpose of this paper to enter into minute historical detail, nor to trace the dissemination of leprosy down through

[1] Awarded the Alvarenga Prize for 1892, by the Philadelphia College of Physicians.

succeeding ages—for it is well known that, from about the beginning of the Christian era to the end of the sixteenth century, it had overrun all Europe, and that before the end of the seventeenth it had been almost wholly eradicated from among the more civilized portions of that continent; its intent will have been subserved if the writer can, from the observations of other competent, painstaking investigators, coupled with his own, cast even a modicum of light upon the nature of a disease whose terrible ravages in times past dethroned kings and made social and political exiles of rulers, prelates, and subjects—a disease the mention of which even yet suffices to create consternation in the stoutest hearts.

At the present time—notwithstanding the fact that no disease was ever regarded with equal abhorrence; notwithstanding that it was once almost entirely exterminated; notwithstanding the rapid advances in civilization, in the arts, and in the sciences; and notwithstanding the earnest efforts, in all ages, of hundreds of noble, self-sacrificing men and women, in and out of the medical profession—it is a lamentable fact, one that should mantle humanity's cheek with the blush of deepest shame, that leprosy exists, throughout the civilized as well as the uncivilized world, as an endemic disease; prevailing as such, however, more extensively in France, Spain, Portugal, Norway, Sweden, Italy, Greece, Russia, China, Asia, Africa, the islands of the Indian and Pacific Oceans, Japan, New Zealand, Australia, Madeira, the West Indies, Central and South America, Cuba, Mexico, the Hawaiian Islands, New Brunswick, and some portions of the United States.

Hansen's discovery, that a particular bacillus is invariably associated with leprosy, has been abundantly confirmed from every quarter of the globe. Thus, Mitra,[1] Rake,[2] Donovan,[3] Kaurin,[4] Arning,[5] Hellat,[6] Goldschmidt,[7] Cornil and Babès,[8] Wheeler,[9] Morrow,[10] Boinet,[11] Thoma,[12] Cantlie,[13] Bouchard,[14] Bourns,[15] Manson,[16] Stullard,[17] Olavide,[18] Gibbs,[19] Dock,[20] Chacon,[21] Looft,[22] and a host of other investigators whose writings have been consulted and whose names might be cited, men who have studied leprosy from every standpoint, unite in the opinion that the *bacillus leprœ* is always present in leprosy, and is its specific cause.

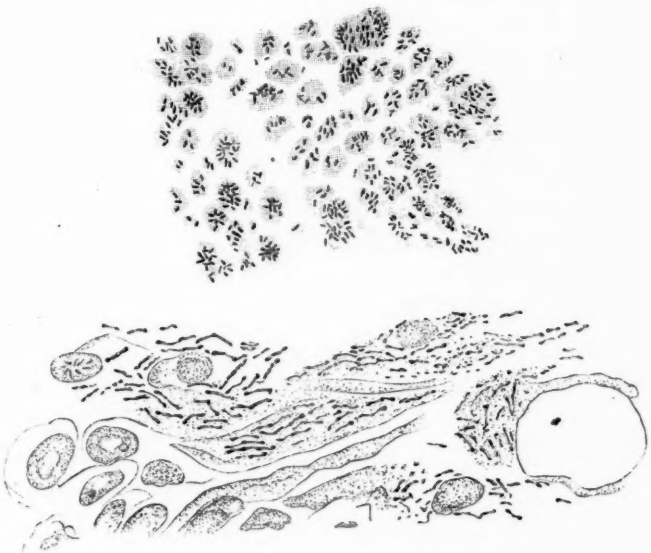
From the enormous quantities of the bacilli always present in leprous tissues, more especially after the process of tuberculization has com-

[1] Amer. Journ. Med. Sci., July, 1891.
[2] London Lancet, January, 1892.
[3] Journ. Lepr. Invest. Com., No. II.
[4] Ibid.
[5] Arch. f. Derm. und Syph., January, 1891.
[6] Journ. Lepr. Invest. Com., No. IV.
[7] Ibid.
[8] Les Bactéries.
[9] Journ. Lepr. Invest. Com., No. II.
[10] Journ. Cut. and Gen.-Ur. Dis., Jan., '90.
[11] Rev. de Méd., 1890.
[12] Deutsche Arch. f. klin. Med., 1890-91.
[13] Brit. Med. Journ., May 4, 1891.
[14] Enfer. Infec.
[15] Intern. Med. An., 1891.
[16] Journ. Lepr. Invest. Com., No. I.
[17] Brit. Med. Journ., Dec. 21, 1889.
[18] Rev. Cl. de los Hosp., Dec., 1889.
[19] Pract. Path. and Morb. Hist.
[20] Trans. Tex. State Assoc., 1889.
[21] Gacet. Med. Mex., Nos. III. and IV.
[22] Centr. f. d. Med., 1891.

menced, Cornil and Babès think leprosy the most classical type of bacterial diseases. They say:[1] "Bien que le contrôle de l'expérimentation nous fosse défaut, les bacilles sont tellement nombreux dans toutes les cellules lèpreuses et dans toutes les lésions de la lèpre, depuis le début des tubercules et pendant toute leur durée, les lésions sont tellement inséparables des bacilles, qu'il est évident que la lèpre est le type le plus net des maladies bactériennes."

The writer has examined thirty cases of tubercular and five cases of macular leprosy, with reference to the presence of bacilli, and has never failed to find them in sections of tubercles, in blood drawn directly therefrom, in discharges from leprous ulcers, and, occasionally, in the sputum and the secretions from the nose; but he has never found them in the feces, urine, or blood, only when the latter was taken directly from a tubercle, although other investigators—Köbner, according to Thoma,[2] and Cantlie[3]—claim to have found them in the blood-current.

FIG. 1.



Lepra bacilli. (After CORNIL and BABÈS.)

The bacilli were plentiful in the sputum and nasal secretions of the subjects of photos Figs. 4, 6, and 8. They were also found in discharges from ulcers in the same subjects, and in a section of skin from the macular spot on the left arm of the subject of Fig. 3.

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit.

Fig. 1 is a fairly good representation of lepra bacilli as seen in the skin of lepers. It is copied from Cornil and Babès' *Les Bactéries.*

Thin,[1] Tache,[2] Münch,[3] Hellat,[4] Sir William Moore,[5] White,[6] Cayley,[7] and, indeed, with one or two notable exceptions, nearly every author whose work the writer has been able to consult, agree—for there seems to be a more general consensus on this point—that, aside from the enervating influences of such environments on the one hand, or their tendencies to physical well-being on the other, and which apply with equal force to all ailments, the origin and spread of leprosy is neither dependent upon nor affected by race, climate, altitude, occupation, food, dwelling, or economical, social, or political conditions.

The opinions of these eminent gentlemen are in strict accord with the writer's experience in Mexico. He has seen the disease, as an endemic one, on the shores of the Mexican Gulf, and high up in the Sierra Madre mountains; in wet, marshy districts, and on dry, *buena vista* tablelands; in its hot, sultry, southern climate, and in its even, temperate, northern exposure; in the palaces of its hidalgos, and in the *jacales* of its peons—among all classes and occupations of its people; but it is more prevalent among the poor than the rich, doubtless because the former class largely predominate and is less mindful of personal hygiene and other protective measures.

As prominent among those not in entire accord with the views above stated, Mr. Jonathan Hutchinson,[8] Francis,[9] Roussel,[10] Thoma,[11] and Ashmead[12] may be mentioned. Mr. Hutchinson contends "that in all former ages when leprosy was prevalent, and in all the various lands where it is now still found, it has had, and still has, one and the same cause—being the taking into the system, in the form of fish food, the poisonous germs of the malady; . . . that the advance of Christianity, with its salt-fish feasts, and not the Crusades, was mainly conducive to the general spread of the disease in Europe during the Middle Ages; that its spreading is always due to food, and never to contagion."

According to his idea, it is not necessary to consume large quantities of fish—a small fragment being sufficient, if containing the bacillus—in order to introduce the germ directly into the stomach and produce the disease. He writes, *loc. cit.:* "It may be by direct introduction of the bacillus into the stomach," or "it may be that some element in fish food rouses into activity a bacillus already existing in the tissues. The first is the more probable supposition, and if it be true, it is obvious that very small quantities of fish, if containing the bacillus, may be efficient to

[1] London Lancet, January 16, 1892.
[2] Journ. Lepr. Invest. Com., No. III.
[3] Ibid.
[4] Journ. Lepr. Invest. Com., No. IV.
[5] Journ. Lepr. Invest. Com., No. I.
[6] Int. Ency. Surg., Ashhurst.
[7] Journ. Lepr. Invest. Com., No. I.
[8] Journ. Lepr. Invest. Com., No. I.
[9] Ibid.
[10] Journ. Lepr. Invest. Com., No. II.
[11] Loc. cit.
[12] Journ. Cut. and Gen.-Ur. Dis., vol. viii.

produce the disease," and "that the development of the parasite is further favored by a diet of fish. Thus the greater severity and rapidity of the disease in countries where it is endemic, and the fewness of recoveries there, may be explained."

Francis accuses unsound vegetables; Roussel sees in fish diet a cause—Thoma, bad fish and insanitary conditions—that may facilitate its transference, while Ashmead recognizes the Japanese custom of eating raw fish as having value in defining the etiology of leprosy. These gentlemen, with Mr. Hutchinson, are, perhaps, the best-known exponents of the "intermediary host" theory of the transmission of leprosy.

That race plays no part in the cause of leprosy is evidenced by the fact of its occurring among all races; that climate does not, by its presence in all climates; that altitude does not, by the fact that it exists down by the seashore and up on the mountain-tops; that occupation does not, for the reason that persons of all vocations have it; that food does not, because found among those eating every variety of food; that dwellings do not, by its visits to palace and hovel; that economical conditions do not, by its ravages among the rich and the poor; that social and political conditions do not, by its attacking both ruler and subject; that fish-eating does not, by its infesting semi-desert districts where fish is unknown; that meat of no kind does, by vegetarians having leprosy; and that vegetables do not, by meat-eaters not escaping it.

Mitra,[1] Castor,[2] Pacha,[3] Blanc,[4] Hood,[5] Goldschmidt,[6] Koch,[7] Navarro,[8] Wheeler,[9] Hicks,[10] Moore,[11] Manson,[12] Murray,[13] Francis,[14] Phillippo,[15] Danielssen,[16] Macnamara,[17] White,[18] Boinet,[19] Chacon,[20] Lovell,[21] Boeck,[22] and many others, regard heredity as potent in the etiology of leprosy. Of eighty cases examined by Boinet, with regard to heredity, fifteen cases were undoubtedly due to this cause; nevertheless, while admitting these figures to be inadequate, since lepers do not readily acknowledge heredity, Boinet does not attach a great deal of importance to heredity as a cause, believing that many cases regarded as hereditary are merely examples of "heredo-contagion."

Navarro,[23] a man of forty years' experience with lepra in Vélez, reports that in 1847 he delivered a woman of a male child covered with leprous spots over the whole cutaneous surface; that in two months leprous tubercles developed on the child's face, elbows, and knees; that the

[1] Loc. cit.
[2] Journ. Lepr. Invest. Com., No. II.
[3] Voyages chez les Lépreux.
[4] Journ. Lepr. Invest. Com., No. II.
[5] Ibid.
[6] Loc. cit.
[7] Journ. Lepr. Invest. Com., No. IV.
[8] Rev. Méd. Bogotá, Nov., 1890.
[9] Journ. Lepr. Invest. Com., No. II.
[10] Ibid.
[11] Loc. cit.
[12] Ibid.
[13] Journ. Lepr. Invest. Com., No. I.
[14] Ibid.
[15] Ibid.
[16] Ibid.
[17] Brit. Med. Journ., Dec. 28, 1889.
[18] Loc. cit.
[19] Rev. de Méd., August, 1890.
[20] Loc. cit.
[21] Journ. Lepr. Invest. Com., No. II.
[22] Ibid., No. I.
[23] Rev. de Méd., August, 1890.

mother and sister, until then quite healthy, soon afterward showed symptoms of leprosy, and that all these cases died of it in less than two years. Again, in 1848, he delivered a woman, in the last stages of "elephantiasis," of a well-formed female child whose body was covered with leprous spots. On the upper portion of the concha of the left ear of this child were also well-developed leprous tubercles.

Hood[1] has seen the infant of a woman with tubercular leprosy developing that form of the disease when only a few months old.

Goldschmidt[2] declares, after twenty-five years' experience, that one-half of the cases may be traced to heredity; while Manson[3] expressed the belief that it would be "difficult to conceive that the lepra bacillus could be handed down from father to son, or from grandfather to grandson; nor is it at all reasonable to suppose," he continues, "that leprosy becomes developed in collateral descendants of a common ancestor in consequence of the transmission of the bacillus itself through the semen or ova of intervening relatives, who themselves, very likely, were not leprous. Such a supposition seems absurd; but . . . we can understand that the appearance of heredity is brought about by the transmission of a physiological tendency to the production of a certain substance the possession of which is absolutely necessary for the development of the disease, and without which no one can become a leper. As with the tubercle bacillus, so with the lepra bacillus: certain individuals, with certain physiological characteristics, which are more or less hereditary, alone being susceptible."

Manson's hypothesis—and it need not, *per se*, exclude direct transmission of the bacillus from mother to child, more especially if, as claimed, these organisms have been found in the blood and lymph currents—recognizes as the cause of leprosy, the bacillus lepræ, "an organism very refractory to cultivation, growing only in a medium which, so far as known, exists only in the bodies of certain human beings. It is not present in everyone." Nor, in those in whom it is produced, is it present at all times; nor, when present, is it always so in equal amount. The bacillus escaping from the body of a leper, finds lodgment in a healthy person possessing this medium, and commences and continues to develop as long as supplied with this particular pabulum; but should this supply become exhausted, the bacilli pass into a condition in which they are powerless to resist the action of certain cells—which are not phagocytes, as they do not destroy the bacilli—into which they become incorporated—*i. e.*, they pass into or are taken within these cells, and remain *hibernating*, as it were, until supplied anew with this pabulum, when they enter again on a fresh phase of activity, they become extra-cellular, and are carried by the blood and lymph to other parts of the body, where

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit.

they set up "additional lepra centres. In this way the disease extends and old lesions are enlarged by local multiplication of the bacilli until the pabulum is again exhausted. The bacilli then enter, or are taken into, the cells again. This recurrence of events continues until the patient dies by gradual extension of lepra lesions, or by intercurrent disease." If, on the other hand, the bacillus enters the body of one who never produces this medium, or in one who does not produce it in sufficient quantities, or in one in which it is not produced in time, the parasite either dies or remains undeveloped and innocuous.

Manson thinks this hypothesis—and it seems as reasonable as any one of the many brought forward to explain certain phenomena of leprosy—explains the prolonged incubation period in so many cases; the difficulty in inoculating man and the lower animals; the quiescence and exacerbations so often seen in the disease; failure to cultivate the bacilli on artificial media; the lifetime immunity of persons in daily intimate association with lepers, and many other phenomena connected with leprosy.

Some writers, while not admitting the disease to be hereditary, look upon heredity as predisposing to it. Thin,[1] after tracing the malady through five generations, says: "It is only in recent years that a sufficient analysis of facts has shown the fallacies that have led to the acceptance of the idea that leprosy is hereditary." He points out, as a well-known fact, the disposition of the disease to hang to certain families.

Kaurin[2] never saw a congenital case of leprosy; does not believe it hereditary, but acknowledges that persons of "hereditary taint" are more liable to contract the disease, on equal exposure, than those not thus vitiated. Tache[3] shares this opinion, as does Arning,[4] Münch,[5] Hellat,[6] Lima,[7] and many others; while Hansen[8] thinks, if at all hereditary, it is very limitedly so. Arning[9] says: "To my mind the theory of hereditary transmission of leprosy must ever appear as an heirloom of a past and gone era in the science of pathology."

To those requiring stronger evidence of hereditary transmission of leprosy than that recorded on the preceding pages, the histories of the following cases, from the writer's personal experience, will carry but little conviction with them:

The subject of Fig. 2, aged twenty-eight years, a shepherd by occupation, is the only child of a leper mother who died of puerperal fever at his birth. Her mother, a brother, and two sisters were lepers. When she married she moved to a distant place from where she was raised, *to a locality where leprosy had never been known.* He was

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit.
[4] Loc. cit. [5] Loc. cit. [6] Loc. cit
[7] Journ. Lepr. Invest. Com., No. IV. [8] Journ. Lepr. Invest. Com., No. I.
[9] Loc. cit.

born four years after his mother married; was raised on goat's milk; never saw a leper; had never left locality where he was born and raised until he did so to consult the writer; had lived, since ten years of age, out of doors, herding goats, high up in the Sierra Madre mountains; was never vaccinated; never had syphilis, nor gonorrhœa, nor skin eruptions. His food for most part has been goat's milk and flesh, eggs, beans, coffee, tortillas and dried fish occasionally. Nodules began on the ear and face at twenty, and gradually extended until they became plentiful on his hands, forearms, feet, and legs, with now and then an ulcer. Sections of skin from one of the tubercles, stained with the Ziehl-Neelsen carbol-fuchsin, showed lepra bacilli in great numbers.

The father, mother, two brothers, and three sisters of the subject of Fig. 3, had leprosy. She is the youngest child. Aged thirty-five; married; mother of five healthy-looking children and the wife of a ranchman in easy circumstances. At birth she was given to a childless aunt, who carried her at once a hundred miles away from place of birth and where leprosy was unknown. Never nursed her mother; was raised on asses' milk; never saw a leper and has had no direct communication with her own family nor with any other having leprosy. Has lived in the locality where she was raised and has never visited leper districts. Her food has been liberal, nutritious, and varied, and often contained fresh and dried fish.

Her attention was attracted, eight years ago, to an oval-shaped spot on the right arm, which was soon followed by another on the left. Since then the spots have slowly increased in size and multiplied in number, until she now has them on both shoulders, breasts, legs, and feet. The circular spot to be seen on her left forearm began some six months ago as a small, dusky, rose-colored discoloration of the skin. As it increased in circumference its central hue grew lighter and lighter until it became almost white. Within this spot—and all the others present the same characteristics—more marked in and nearest the centre, the sensibility is diminished to almost complete anæsthesia. Both ulnar nerves are enlarged and sensitive; the fingers and toes are clumsy, somewhat anæsthetic and formicating.

On the left side of the face three tubercles may be seen; there is also one on the lobule of the right ear. The first to appear, about two years ago—that on the cheek—being much the largest of the three. A section of skin from this tubercle contained enormous quantities of bacilli—twenty times as many, or more, than in skin taken from the spot on the left arm. (Philippson[1] reports having found "swarms" of bacilli in skin taken from acute erythematous patches of lepra; but the writer has never seen them in such quantities, except in skin from tubercles.)

The life-period of the bacillus lepræ is unknown—no culture experiments having, as yet, been successful; but if it be like that of its congeners of lupus and tuberculosis, capable, under favorable conditions, of prolonged hibernation and of resuming vital activity when influenced by propitious circumstances—the presence of Manson's "cultivating medium," whatever that is—the fact that the disease it engenders, like lupus and tuberculosis, while it may appear at any period of life, is seen

[1] Monats. f. prakt. Derm., No. 9, 91.

FIG. 2.

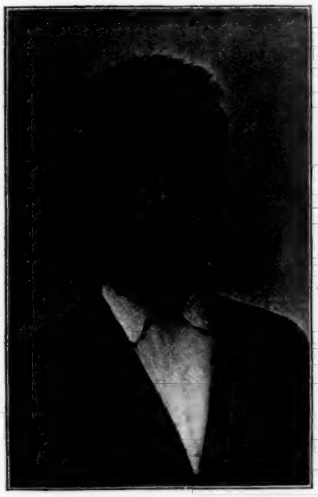


FIG. 3.

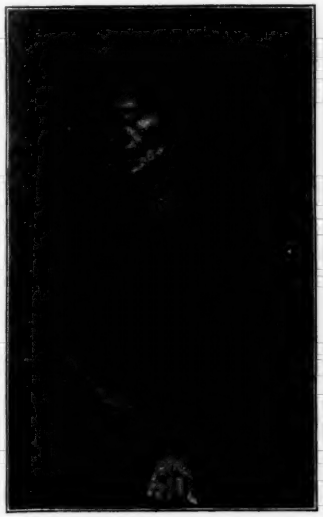
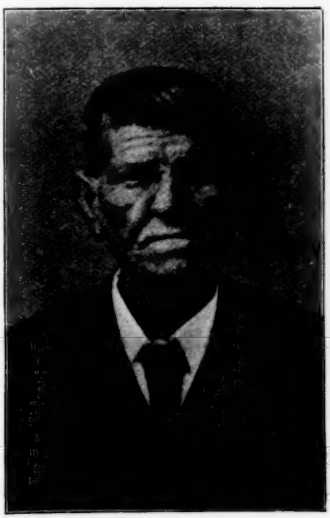


FIG. 4.

FIG. 5.



with greatest frequency between the ages of ten and thirty years, is, in the writer's humble judgment, a stronger argument in favor of than against heredity.

The statement of non-believers in the hereditary transmission of leprosy, that the disease renders the male impotent, is true only after it has made considerable progress, and is not always true even then; it does not apply to the female at all. The original of Fig. 6 has been under the writer's observation for the last ten years; he was a confirmed leper when first seen, and his youngest child is but three years of age. The original of Fig. 2, taken four years ago, himself the son of a leper mother, had a child born to him since his photograph was made, while the mother of the subjects of Figs. 4, 7, and 8, and the mother of the subject of Fig. 3, bore numerous children after becoming lepers, if, indeed, either of them were ever otherwise than lepers, for, from information furnished by reliable parties, the families of both, for several generations back, have contained male and female lepers—families to which leprosy has clung for ages.

If, as seems proved beyond controversy, the bacillus of leprosy, let it enter the human economy howsoever it may, is taken up by the leucocytes and other cells and circulates in the blood and lymph currents to internal organs, such as the liver, spleen, medulla of bone, etc., the writer knows of no reason why it may not, with equal facility, be carried to the fœtus *in utero*, and in this way directly transmit the germ, if not the disease, by inheritance. When it is remembered that Birch-Hirschfeld and Schmal [1] have recently found tubercle bacilli in the umbilical cord and in the blood of the umbilical vein, and that Solles [2] has produced tuberculosis in guinea pigs by inoculating them with spermatic fluid taken from the seminal vesicle of a tuberculous subject, the difficulty of conceiving how lepra bacilli may be handed down from parent to child fades into absolute nothingness.

In September, 1884, Arning [3] inoculated, in the Hawaiian Islands, a man by the name of Keanu—who was thought to be free from all leprous taint—with leprous material taken directly from a child who had severe tuberous leprosy, and who had just gone through leprotic fever. The inoculation was made by introducing a small piece of the leprous nodule under the skin of the left forearm. In four weeks Keanu had rheumatic pains in the left shoulder, followed by pain in the joints of the arm and swelling and pain in the ulnar and median nerves, without fever. Within six months the neuritis decreased, and a small leprous nodule formed where the inoculation had been made. Sixteen months later lepra bacilli were still to be detected at the point of inoculation. In

[1] Beiträge zur. path. Anat. u. zur. allg. Path., 1891.
[2] Journ. de Méd. de Bordeaux, 1892, No. 5.
[3] Loc. cit.

FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

September, 1887, Keanu showed distinct symptoms of leprosy, and in another year the disease was at its acme.

This case was for a time thought demonstrative of the inoculability of leprosy, but it soon came to light that a son, a nephew, and a cousin of Keanu had leprosy, when it began to lose prestige as such, until to-day it is regarded as proving nothing whatever in that direction. Notwithstanding this, however, and notwithstanding that efforts to inoculate healthy persons with leprous material have failed in Norway and Italy, many, experienced in the management and care of the disease, regard it as inoculable, while others of equal opportunities deny that it is. Mitra[1] says: "Contagion by inoculation is possible and often occurs; . . . and that all the different ways by which syphilis can be passed from one individual to another, extra-genitally, hold good for leprosy."

Arning,[2] Murray,[3] Cayley,[4] Francis,[5] Hederstam,[6] Manson,[7] Swift and Montgomery,[8] Olavide,[9] White,[10] Wilson,[11] Martin,[12] Bakewell,[13] Fox,[14] Castor,[15] Ebden,[16] Bemiss,[17] Hildebrandt,[18] Mouritz,[19] Gairdner,[20] Black,[21] Brunt,[22] Daubler,[23] Piffard,[24] Hillis,[25] Leloir,[26] and others, are of the opinion that the disease is inoculable, some of them reporting cases in justification of their faith.

Abraham,[27] analyzing these and other reported cases of supposed inoculation by vaccination and otherwise, admitted that instances have, occasionally, been reasonably demonstrated of its communication from one infected person to another previously healthy, contends that "Even the most suspicious cases . . . are open to the objection that there is nothing to show that the subjects had never been exposed to any other possible means of inoculation or contagion, had never been in contact with lepers, or had never had to do with food or anything else which might have been contaminated by lepers; in short, one could not be sure that having been born, or having lived for some time in a leper land, they had not been exposed to other pathogenic conditions of the disease; . . . and that while up to the present time no absolutely clear and incontrovertible evidence connecting vaccination with leprosy had been forthcoming," he admits, "*a priori*, the possibility of an occasional accidental inoculation of the disease in this way," and thinks medical men should exercise extreme care in selecting vaccine lymph, and should avoid indiscriminate arm-to-arm vaccination where leprosy is endemic.

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit. [4] Loc. cit.
[5] Loc. cit. [6] Journ. Lepr. Invest. Com., No. I. [7] Loc. cit.
[8] Occid Med. Times, September, 1890. [9] Loc. cit. [10] Loc. cit.
[11] London Lancet, August 22, 1891. Abstract of Dr. Abraham's paper before Internat. Cong. of Hygiene, 1891.
[12] Ibid. [13] Ibid. [14] Ibid. [15] Ibid. [16] Ibid. [17] Ibid.
[18] Ibid. [19] Ibid. [20] Ibid. [21] Ibid. [22] Ibid. [23] Ibid.
[24] Ibid. [25] Ibid. [26] Ibid. [27] Ibid.

Donovan[1] can find no evidence in support of the idea that leprosy is communicated by vaccination; neither can Ashmead,[2] nor Rake and Buckmaster.[3]

These latter gentlemen, members of the "Leprosy Investigation Committee," vaccinated eighty-seven patients at the Almora Asylum, Robbens Island, in 1891, from which they made ninety-three microscopical preparations, in no one of which did they *undoubtedly* find lepra bacilli. "Suspicious-looking rods taking fuchsin were seen in one case in vesicles raised over tuberculated ears, and in another case in vesicles over anæsthetic patches."

Looking at the subject from every side, Rake and Buckmaster conclude "that the risk of transmission of leprosy by vaccination is so small, that for all practical purposes it may be disregarded."

Very many physicians in Mexico, those who have seen much of leprosy—laymen also—recognize the *a priori* danger of transmitting it by vaccination; but the writer has never met a leper who claims to have been inoculated in that way; and in every case claiming to have been inoculated at all, he has ascertained the possibility of the disease being contracted in divers other ways. The majority of them date the beginning of their malady from getting wet in cold weather—possibly from the rheumatic pains so constant in the early stage of leprosy.

The efforts to cultivate lepra bacilli, made by Rake and Buckmaster,[4] Kanthack and Barclay,[5] Abraham and Crookshank,[6] Koch,[7] Christman,[8] Stallard,[9] and others, have all failed, and if the experiments being made by Campana[10] be not successful, then, in the language of Hansen[11] and of Stuart,[12] it may be said that, up to this time—April 20, 1892—"nobody has succeeded in cultivating the bacillus of lepra."

Equally futile have been the attempts of Kaurin,[13] Goldschmidt,[14] Favarat,[15] Christman,[16] Rake,[17] Kanthack,[18] Barclay,[19] Campana,[20] the writer, and many others to inoculate the lower animals with lepra bacilli; and the claim made by Bordoni-Uffreduzzi, in Turin, of having cultivated the bacilli from the marrow of bone, and that of Ortmann, of successfully inoculating it on rabbits, has not been substantiated by others, and is generally regarded as a mistake.

The contagiousness of leprosy is asserted and denied with much vehemence by a great many whose position and experience should constitute them competent judges in the premises. Very much the same

[1] Loc. cit. [2] Loc. cit. [3] Journ. Lepr. Invest. Com., No. IV.
[4] Brit. Med. Journ., June 27, 1891. [5] Brit. Med. Journ., August 27, 1891.
[6] Journ. Lepr. Invest. Com. No. IV. [7] Ibid.
[8] Centralbl. f. Bakt. u. Parasit., x. 1890, iv. [9] Occid. Med. Times, April, 1890.
[10] Journ. Lepr. Invest. Com., No. IV. [11] Loc. cit.
[12] Vierordt's Med. Diagnosis. [13] Loc. cit.
[14] Journ. Lepr. Invest. Com., No. IV. [15] Ibid. [16] Ibid.
[17] Loc. cit. [18] Brit. Med. Journ., June 6, 1891. [19] Ibid.
[20] Journ. Lepr. Invest. Com., No. IV.

argument is used against the contagiousnoss of leprosy as that relied on to disprove its inoculability and transmissibility by heredity, viz.: that all the reported cases of supposed contagion lived, or had lived, in localities where lepra was endemic; hence they might, with equal propriety, be considered examples of infection. The well-known case of Father Damien may be given as one in point. It was once very generally accepted as tending to establish the theory of contagion. But it is now urged by Rake[1] and others, that as "he lived in a leper colony for a number of years, and then developed leprosy, he may have absorbed the specific virus in many other ways, *e. g.*, in food, water, air, etc." Rake then refers to a case reported by Dr. Hawtry, of a man who "returned to Ireland, after many years of service in India, and developed leprosy, of which he died. His brother, a laborer, who had never been out of the United Kingdom, slept in the same bed with him, and in course of time he, in his turn, became a leper. Except his brother's, no case of leprosy had occurred in the neighborhood, according to tradition, for centuries."

In all reported cases of contagion Hutchinson[2] thinks the food hypothesis equally probable with that of contagion; and Mitra[3] "can only cite one case, that of a wife from her husband, where a leper has transmitted the disease to any member of his family, however intimately they may have commingled," and as already stated, believes it "contagious by inoculation." Taché[4] holds "contagion as the cause of the propagation of the disease." Blanc[5] thinks the disease "may be communicated by a leprous person by means of a specific virus, which acts somewhat like the specific poison of syphilis, depending upon a thin or denuded surface for its absorption, and which remains potent, very probably, for an indefinite period of time." Arning[6] contends that it is contagious. Münch[7] ranges himself "on the side of the deeply convinced believers in its contagiousness." Lima[8] cites cases of supposed contagion "sufficiently eloquent to render unnecessary further illustration." Thin[9] traced sixty cases of leprosy in Parcent, where the disease did not exist before, to infection from a leper who went there in 1850. Donovan[10] says: "There is no longer any room to doubt that leprosy may be classed among parasitic diseases, and is consequently infective, its products being specifically contagious." According to Hellat,[11] the "rapid increase through free communication and the just as rapid decrease of the disease by isolation, are explained without difficulty by means of infection." Goldschmidt[12] concludes, after twenty-five years' experience, and after having to do with most of the known cases in Madeira, "that

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit. [4] Loc. cit.
[5] Loc. cit. [6] Loc. cit. [7] Loc. cit. [8] Loc. cit.
[9] London Lancet, January 16, 1892. [10] Loc. cit. [11] Loc. cit.
[12] Loc. cit.

infection is directly propagated from man to man, or what was in immediate contact with the diseased body." Koch[1] asserts that "the fact appears clear enough that under certain conditions, about which we at present know little, the disease may be transmitted by contagion." Cornil and Babès[2] define leprosy as a chronic infectious malady.[3] Hicks[4] declares there is the strongest evidence that the disease is contagious. Simmons[5] reports several cases of contagion; while Wheeler[6] thinks that "it requires hereditary tendency for infection." Ross[7] looks upon the question of contagion as an open one, but writes: "It is demonstrable that leprosy is communicable, to some extent, in the same sense as cancer or syphilis." Boinet[8] analyzed eighty cases and found the possibility of direct contagion in fifty-one. Hillis[9] writes: "A further experience of ten years has convinced me more firmly than ever that leprosy is a communicable disease;" and Castor[10] thinks "there is sufficient evidence found even in lay journals that it is communicable." Bouchard[11] deplores the false and dangerous security hidden in the "optimistic chimera" that leprosy is not contagious. Moore[12] asserts: "After the number of cases which have been reported, there seems no reasonable doubt that leprosy may be communicated from one individual to another." Cayley[13] and Murray[14] share this opinion; and Phillippo[15] distinctly states his opinion "that it is contagious." Heidenstam,[16] after eleven years' service in the leper asylum in Cypress, "is more than ever convinced of the communicability of lepra." Lutz[17] thinks "infection from one person to another responsible for the larger number of lepers in Honolulu." "Archdeacon Wright[18] has published a book in which he has brought together evidence collected from various sources, . . . showing that leprosy is contagious; and Mr. Macnamara has published a second edition of a pamphlet originally published in Calcutta in 1866, in which he expressed the opinion that leprosy was communicable. Zuñaga has published facts observed by him at the village of Limat Valldigna, Spain, which appear to point very unmistakably to the transmission of leprosy by contagion." Stallard[19] and White[20] regard the spread of leprosy in the Sandwich Islands as affording absolute proof of contagion. Olavide,[21] in an experience of twenty-five years, and after investigating five hundred cases, has never seen any evidence

[1] Loc. cit.
[2] Loc. cit.
[3] La lèpre est une maladie infectieuse chronique.
[4] Brit. Med. Journ., November 8, 1890.
[5] Journ. Lepr. Invest. Com., No. III.
[6] Journ. Lepr. Invest. Com., No. II.
[7] Journ. Lepr. Invest. Com., No. II.
[8] Journ. Lepr. Invest. Com., No. III.
[9] Journ. Lepr. Invest. Com., No. II.
[10] Journ. Lepr. Invest. Com., No. III.
[11] Enfermedades Infecciosis.
[12] Loc. cit.
[13] Loc. cit.
[14] Loc. cit.
[15] Loc. cit.
[16] Journ. Lepr. Invest. Com., No. I.
[17] Journ. Lepr. Invest. Com., No. I.
[18] Brit. Med. Journ., Dec. 28, 1889.
[19] Brit. Med. Journ., Dec. 21, 1889.
[20] Int. Ency. Surg., vol. ii.
[21] Rev. Clin. de los Hosp., Madrid, 1889.

of transmission of leprosy by contagion, and has never seen but one case who claimed to have contracted the disease in that way; he thinks, *a priori*, the disease should be contagious. Macnamara[1] reports a case of contagion, and says the disease "is contagious, not in the same way as we understand this expression when applied to such diseases as the exanthemata, but slowly, in such manner as it is now held that phthisis pulmonalis is contagious . . . it is a disease which is slowly contagious under certain conditions of environment and individual idiosyncrasy."

Of leprosy in Crete, Biliotti[2] writes: "That it is not contagious, or is very slightly so, is proved by the fact that there are several cases of healthy women married to and living with lepers for years without being in the least affected." Dixon[3] says: "The evidence gathered from officials and patients, long resident on Robbens Island, shows that there is no authentic instance, with possibly one exception, of any non-leprous person on the island having contracted the disease from contact, either directly or indirectly, with leper residents." Flinders[4] writes from New Zealand "that the immunity from the disease, enjoyed by women who have lived for years with leprous men and *vice versa*, makes it difficult to believe that it is infectious or contagious in the ordinary sense." Bulkley[5] thinks "the disease is not contagious in the ordinary acceptation of the term, as applied to such diseases as smallpox, scarlatina, or syphilis," but admits "there is evidence that when acquired the disease may, under favorable conditions, be transferred from one person to another;" and, finally, Hansen[6] says: "It is said that it is not contagious in the ordinary sense of the word; probably I do not know what the ordinary sense of the word is; but if someone would say communicable instead of contagious, I would not object. . . . I, for my part, prefer what is plainest and most intelligible, and that is the contagion hypothesis."

The subjects of Figs. 5 and 6 illustrate most aptly the fact that lepers may live for years with the healthy without imparting the disease in any, as yet, recognizable shape. That of Fig. 5—the only member of his family who ever had leprosy—resided for *sixty-two years in a locality where the disease has been endemic for the past two hundred years; where 30 per cent. of his neighbors are lepers; on terms of the most unrestricted social intimacy with lepers in every stage of the disease; using the same utensils, sleeping often in the same bed, in rooms without ventilation; drinking from the same goblets; wearing the same clothing; dressing the ulcers of, and caring for, his "unclean" friends without limit or restriction whatsoever, without contracting the disease. He is now seventy years of age, and the victim of lepra tuberosa, having passed through the other two stages of the disease.* His disease commenced (*i. e.*, the writer has been his physician for ten years, and up to eight years

[1] London Lancet, March 26, 1892.
[2] Journ. Lepr. Invest. Com., No. III.
[3] Loc. cit.
[4] New York Medical Record, No. 1113.
[5] New York Medical Record, No. 1113.
[6] Loc. cit.

ago he, the subject, declares he has never had a day of sickness since childhood, and he certainly looked the picture of health) with a burning, erythematous-looking eruption on both legs, midway between the knee and ankle, which gradually extended up and down and around the leg until it reached nearly to the knee and ankle, and had nearly surrounded the leg. *Pari passu* with the peripheral extension of the macula, its centre faded into a dusky white. In the meantime the legs began to swell, and the patient to complain of numbness and stiffness of the limbs with fugitive, rheumatic pains up and down, to the knees above and toes below. Pressure over the course of the musculo-cutaneous, anterior tibial, and internal saphenous nerves caused severe pain. As the maculæ gradually faded away—the skin never returned to its natural hue, but remained lighter in color—the pains subsided and the numbness increased to semi-anæsthesia; partial muscular atrophy following with loss of both little toes. A few maculæ, similar to the ones described, appeared on other portions of the body.

Four years from the (apparent) beginning of the disease in this case, tubercles formed on the lobules of the ears, nose, forehead, cheeks, lips, chin, hands, and feet, until they occupied these parts in as thick profusion as is seen in Figs. 2 and 4, and also in Fig. 1 of Duhring's article in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, March, 1892.

The original of Fig. 6—as may be seen, a most repulsive looking object—has lived with his family in the same poorly-ventilated house; occupying the same bed; eating and drinking from the same vessels; in short, he has lived with them—four sisters, their husbands, their children, his wife and their children—in a locality where the disease has also been endemic for *two hundred years, surrounded by the most insanative of environments, without imparting the disease to any of them in any, as yet, recognizable form—they all appear healthy.* And so, also, with the father of subjects of Figs. 4, 7, and 8. He lived twenty years with a leper wife, and ten years with leper sons, under as unfavorable hygienic conditions as the cases recorded above, and is, to-day, April 20, 1892, apparaetly as healthy and vigorous as any man of his age (sixty) and physique.

Concerning the *treatment* of leprosy, there is as much difference in opinion as there is about the manner of its propagation.

Mitra[1] found gurjun, chaulmoogra, and creolin useful to heal ulcers, but powerless to arrest the disease. Nerve-stretching, in his hands, was of palliative value in fifty cases of anæsthetic leprosy. Donovan[2] reports marked benefit from gurjun oil, internally and externally, in some cases. Taché[3] thinks attention to functional disorders, palliative treatment, attentive nursing, while working no cures, are highly beneficial. Lima[4] regards with favor applications of "gynocardic acid, the oil of *Gynocardia odorata*, and phenic acid; and in case of leprous fever, salicylate of soda. Externally, frictions of pyrogallic acid, ichthyol, and chrysarobin. For large leprous tumors, friction with vaseline con-

[1] Loc. cit.
[2] British Medical Journal, August 8, 1891.
[3] Loc. cit.
[4] Loc. cit.

taining sublimate, and the thermo-cautery of Paquelin, as excellent measures for their reduction." He claims that by these means patients sometimes gain "both in vigor and weight." Goldschmidt[1] has never obtained any "lasting benefit from any of the varied measures" he employed. Koch[2] summarizes the treatment of leprosy in the following language: "No drug has yet been used which exerts a specific action on lepro-y; of the drugs used, chaulmoogra oil seems to act most beneficially."

Münch[3] asserts "that the efficacious action of certain drugs (creosote, oleum chaulmoogra, etc.), and the apparent convalescence of lepers during the period of florescence, could, with greater reason, be attributed to the more rapid passage, during the employment of one remedy or another, of the florescent stage into the regressive." He cites a case "whose infiltrations, after the use of creosote, disappeared entirely;" but, "on post-mortem examination, an enormous number of lepra bacilli in the skin, nerves, nervous knots, lymphatic glands, spleen, liver, etc., proved the patient still leprous."

Rake,[4] writing of the results of two cases of amputation for leprotic gangrene, says: "Very much may be done by operative interference in leprosy, even in desperate cases;" and with regard to the use of chaulmoogra oil, he observed "increase of perspiration, decrease of tubercles, improved appetite and sense of well-being, increase of sensation, increased suppleness of the skin, and lessening of pain in the joints."[5]

Roose[6] says some benefit may be derived from the remedies usually employed; while Pontoppidan[7] lauds salicylate of soda, especially in anæsthetic leprosy. He has seen it cut short the fever and stage of acute eruption, and cause absorption of newly formed tubercles in tubercular leprosy; but never saw any "permanent" benefit follow ichthyol, Unna's treatment, chaulmoogra oil, nor salicylate of mercury. In his experience, iodide of potassium always caused increase of eruption, and for this reason he thinks it of value in determining if a given case is cured; if no eruption follows its use, the case may be considered radically cured(?).

Bakewell,[8] commenting on the treatment of Beauperthuy, considers it could only be successful when commenced early in the disease. This method—the one he follows—consists of three parts:

1. Hygiene or dietetic, including removal to a healthy locality, good diet, cleanliness, separation from other lepers, and protection from infection from mosquitoes. 2. The use of external applications, especially

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit.
[4] British Medical Journal, March, 1890. [5] Journal of Leprosy Invest. Com., No. II.
[6] Leprosy and its Prevention. [7] Monats. f. prakt. Derm., 1890, vol. x.
[8] Abstract of a paper read at a meeting of the Royal Medical and Chirurgical Society, May 27, 1890. British Medical Journal, May 31, 1891; also, Journal of Leprosy Invest. Com., No. I., and discussion thereon.

the oil of cashew-nut (*Anacardium occidentale*), generally, of nitrate of silver to anæsthetic parts, and of liniments to other parts. 3. Internal medication by small doses of alkaline salts. Beauperthuy used mercuric chloride; Bakewell had not found it of value. Most reliance was placed upon the external treatment. The oil of cashew-nut produced sufficient irritation to cause slight oozing, which went on for a day or two and then dried and left a scab. When this fell off the tubercle was diminished in size. The process was repeated two or three times. In more chronic cases with much anæsthesia, a mixed solution of nitrate of silver and copper gave the best results. Care must be taken not to apply the oil over too large a surface—for example, never more than six inches square. Bakewell urged that treatment, both medical and hygienic, should be vigorously carried out in the early stage. Mr. Macnamara could not agree with the author's views as to the curability of leprosy. He had never seen a case which was even relieved by treatment, though it was true that there was a quiet stage during which apparent improvement took place. When once established, the disease advanced from bad to worse. Dr. Thin insisted that occasionally the skin lost its anæsthesia and became sensitive and the spots disappeared; this was generally due to the use of some external irritant. He thought the disease might be arrested, and mentioned that Mr. Hutchinson had shown a case to the Society. The woman was now well, whereas twenty years previously she was afflicted with marked tubercular leprosy. Dr. Abraham thought that a cure ought to be attempted, though it was not always easy to recognize the earliest symptoms. The disease was probably not curable, though it might abort and die out. The drug preferred by lepers themselves was chaulmoogra oil.

Bergé[1] extols this remedy (chaulmoogra oil), and gives notes of three cases in which it was employed with great benefit. The results seem remarkable. The dosage was ten drops of the oil in a spoonful of water three times daily, gradually increased until forty-five drops three times daily were taken without disturbance of the alimentary canal, except in large doses, when the bowels were acted upon too violently. The author thinks the oil should be regarded as a specific. Its absorptive properties were manifested in a striking degree upon the tubercular infiltrations; it afforded relief to the nervous phenomena, relieved the anæsthesia, and restored health to the body and mind.

Bourns[2] says reliance can only be placed in chaulmoogra and gurjun oils. Moore[3] writes: "Under the influence of tonics, oils, nourishing diet, good personal hygiene, and general sanitation, improvement often takes place, and the progress of the disease may, perhaps, be temporarily

[1] See AMER. JOURN. MED. SCI., April, 1892, p. 473.
[2] Int. Med. Ann., 1889. [3] Loc. cit.

arrested. The cachetic leper becomes a robust leper; but the leper remains a leper." He knows of "no remedial agent which directly affects leprosy."

Murray[1] has exhibited most of the medicines in the Pharmacopœia, with temporary relief in many cases; but the disease soon resumed its active state. He found the inspissated milky juice of the *Calotropia gigantica* the most efficacious of any drug employed.

Van der Straaten[2] has known treatment by chaulmoogra oil, as an inunction and taken internally, to have been very beneficial in several cases.

Lutz[3] reports, after six months' work at the Kalihi Hospital, that several of the tubercular cases showed a marked improvement, no fresh symptoms appearing and the old ones diminishing gradually . . . and a similar effect on the large brownish pigmentations peculiar to the tuberous form in active state. He used chaulmoogra oil, gynocardic acid, salol, salicylate of soda, creosote, nitrate of silver, antipyrine, mercury, iodine, etc. He is of opinion that the principal treatment should be general, and directed against the first outbreak, the feverish and eruptive period, and to removing the deposits. He favors chrysarobin for this latter object, in a 5 or 10 per cent. solution.

Stallard[4] had proved to his own satisfaction that leprosy can be arrested and prevented by abundant good nourishing food and proper hygiene; while White[5] asserts there is no specific remedy for leprosy, but that it may be delayed by removal, at an early stage of the disease, to regions where it is not endemic.

Rake[6] resorted to nerve-stretching in one hundred cases; but the operation seemed of value only for the pain associated with ulceration, in which relief was often very marked.

"Leprosy is regarded by many as incurable, nevertheless reports of recoveries seem to be gradually increasing in number, although no new remedies have been discovered."[7]

Francis[8] reports a case of an Englishman, born in India but educated at home, who contracted the disease in India, returned to England, and was so far cured in three years that he looked "stout, ruddy, and in perfect health and spirits," and remained so up to the last information he had of him.

Kaurin,[9] while denying there is anything like a specific for any stage of leprosy, says that, "if taken at an early stage, the disease may be cured by good diet and regimen, by careful nursing of the skin, baths, and symptomatic treatment."

[1] Loc. cit. [2] Loc. cit. [3] Bien. Rept. of Pres. Bd. of Health, Honolulu, 1891.
[4] Brit. Med. Journ., December 21, 1889.
[5] Int. Ency. of Surg., vol. ii. [6] Brit. Med. Journ., December 28, 1890.
[7] Editorial, Med. News, No. 947. [8] Journ. Lepr. Invest. Com., No. IV.
[9] Loc. cit.

Blanc[1] reports recovery of a case of "maculo-anæsthetic" leprosy after prolonged use of chaulmoogra oil internally and pyrogallol locally.

Lima[2] looks upon the disease as incurable, but admits the occurrence of a few cases of "spontaneous recoveries."

Fox[3] publishes a case presenting all the typical lesions of leprosy, under his observation for many years, who recovered after the systematic use of chaulmoogra oil.

Hellat[4] regards leprosy as "incurable," and Wheeler,[5] Roose,[6] Abraham,[7] and White,[8] indorse this opinion.

In the discussion of Bakewell's paper before the Royal Medical and Chirurgical Society, already quoted from, Thin said he had seen "a case in which the anæsthesia of the skin had been got rid of by treatment;" and that a medical man practising in Jerusalem reported a case, under observation for several years, in which a cure appeared to have been effected.

Commenting on these cases, and those reported by Unna, Fox, and Hutchinson, and on the official report from the Norwegian Asylums, where thirty-five cases were reported cured within the last five years, Abraham said: "One did come across cases in the records of asylums, in which the disease seemed, in course of time, to have died out or to have stopped its progress; from which it could be inferred that every case was not hopeless."

Phillippo[9] cured a case after nearly six years' constant use of gurjun and chaulmoogra oils. He thinks that "many of the reported failures with these oils are due to their improper and insufficient use, both as regards time and quantity. As a rule, it can only be properly done in specially appointed hospitals or asylums, where the necessary conditions obtain for such prolonged and troublesome treatment."

Tuberculin, in leprosy, seems to exert no marked influence in any way. Danielssen[10] treated with it five cases of anæsthetic, three of tubercular, and six cases of mixed leprosy for four months without benefit. Abraham[11] treated a case of tuberculous leprosy with tuberculin, with some improvement, and a case of macular leprosy, with marked benefit. Arning[12] could see no good results in two cases of tubercular variety on whom he used it; nor could Babès and Kalindero,[13] in seven; nor Donovan,[14] in three; nor Goldschmidt,[15] in five. Donovan noted increase in weight, and his patients professed feeling better in every way; but he could not appreciate any change in the appearance and character of the

[1] Loc. cit. [2] Loc. cit. [3] New York Med. Journ., February, 1896.
[4] Loc. cit. [5] Loc. cit. [6] Loc. cit. [7] Loc. cit.
[8] Loc. cit. [9] New England Med. Monthly, No. 10.
[10] Monats. f. prakt. Derm., August, 1891. [11] Loc. cit. [12] Loc. cit.
[13] Journal of Leprosy Invest. Com., No. II. [14] Loc. cit.
[15] Berlin. klin. Wochenschr., January, 1891.

tubercles, atrophic changes, or anæsthesia. Ferrari,[1] analyzing the trials made with tuberculin by Goldschmidt, Martins, Joseph, Neumann, Arning, Hallopeau, Bardeleben, Babès and Kalindero, Maes, Kaposi, Watson Cheyne, Danielssen, and De Amiées, and detailing his own observations in eight cases in the tuberculous stage, concludes that it produces no direct beneficial action on the leper.

The writer has experimented for the past ten years with a great many drugs, on a great many lepers; and while he has seen some truly marvellous results—results he was in nowise prepared to witness—follow the use of certain measures, he is not prepared to assert positively that he has brought about a *radical cure* of a single case of leprosy, in either of its stages. Arsenical, mercurial, and iodine preparations, in his hands, when the disease was not associated with syphilis—and it is often thus associated—have been worse than useless; but he has seen such very marked improvement, in all three stages of leprosy, follow the systematic use of chaulmoogra oil, internally and locally, associated with an improved dietary and personal hygiene, in a sufficient number of cases to induce the belief that, while in no sense a specific, as regarded by Bergé, *if commenced early in the disease, and continued long enough and unintermittingly, and associated with proper food and hygiene, it will cure the disease in many instances.* Of course, there are many cases it will not benefit, probably a large majority of them, but the writer has never seen it properly used without notable improvement, especially in the tubercular stage. *He has seen tubercles absorbed, anæsthesia removed, eruptions disappear, ulcers heal, pains quieted, suppleness and elasticity of the skin restored, and hope take the place of despair under its use.* The writer begins treatment with ten drops of the oil, in gelatin capsules, after each meal, to be taken with a glass of milk, the quantity to be gradually increased until from one to two drachms of the oil is taken daily; but few can take as much as two drachms daily without producing diarrhœa. At the same time the patient is bathed every second day with warm water and soap, the oil is warmed and well rubbed into the skin, over the entire body, including ulcers, maculæ, and all.

The subject of Fig. 6 has been the object of experiment for ten years. During that time he has been subjected to almost every variety of treatment (except tuberculin) without benefit, unless cod-liver oil with hypophosphites, which he took for one year, retarded the progress of the disease—and it seemed to do so, as it made no appreciable advance during that period. Ten years ago he was a confirmed leper in the tubercular stage, and when he commenced, one year ago, the use of chaulmoogra oil, was as hideous a specimen of suffering humanity as is often met with. He was covered from head to foot, with ulcers and tubercles. His mouth, lips, nose, cheeks, throat, and larynx were all extensively ulcerated; and he was entirely aphonic, and swallowed with

[1] "La Tuberculina Koch, nella Lebbra," Accad. Gioenia di Catania, May 24, 1891.

the greatest difficulty. He has taken a drachm and a half of the oil daily for eight months, and has had it rubbed into the skin, with equal frequency, for a year. His improvement has been gradual and continuous, and on the 1st of March, 1892, he presented the appearance, repulsive as it still is, shown in Fig. 6. *All the ulcers are healed* but the one on the right jaw, the tubercles have almost entirely disappeared; he can now swallow without difficulty; his voice, although high-pitched and screeching, has, in a great measure, been restored. He has gained twenty pounds in weight; has returned to his former vocation, herding goats, and the poor creature, disfigured out of all recognition of his former self, is now hopeful of eventually ridding himself entirely of his dreadful enemy.

The writer regrets exceedingly not being able to exhibit a photograph of this case at the time he began using the oil; but, as with the subject of Fig. 5, nothing could induce him to be photographed—the appeal of family, friends, clergy, nor the offer of money.

Fig. 9 shows the condition of the subject of Fig. 8 on April 1, 1892, four months after the latter was made, and three months after treatment was commenced. He, too, had ulcers in the nose, larynx, and on the feet and legs, and was aphonic, but not to the extent of the subject of Fig. 6. Ulcers are nearly all healed; his voice, while stridulous, is greatly improved, and, as may be seen, the tubercles are notably diminished in number and in size, leaving, in many places, in their stead, a coppery discoloration of the skin. A section of skin, from one of the spots, the former site of a tubercle from which a section was taken before treatment began, examined a few days ago, still contains numerous lepra bacilli, *but not one-third as many as were found in the tubercle.*

One of the chief obstacles in the treatment of leprosy is inducing lepers to persevere in the methods employed. They soon lose all hope, regard themselves as social outcasts—although their liberties are not abridged in Mexico—become lethargic, indolent, careless, and often repel, in anger, the efforts of family and friends in their behalf; they seem to become de-humanized in the extreme.

In 1886 the writer had under observation a tubercular leper who contracted violent erysipelas of the head and face; upon recovery and after complete desquamation, it was noticed that *every small tubercle had disappeared and that the larger ones had greatly diminished in size wherever the erysipelas had been.* Remembering this case, and that Danielssen and Boeck,[1] Rake,[2] and Hardy[3] had observed complete disappearance of leprous tubercles after vaccination and after variola, he (the writer) concluded, notwithstanding Campana[4] is reported to have inoculated lepers with erysipelas without affecting the leprous progress, to inoculate the subject of Fig. 5 with erysipelatous material. This he did in November, 1891, and with the most gratifying results, so far as the leprous process was concerned. As already stated, the head, ears, face, nose, lips, etc., of this patient were once as thickly covered with leprous

[1] Brit. Med. Journ., June 3, 1891. [2] Ibid. [3] Ibid. [4] Ibid.

tubercles as were the corresponding parts of the subjects of Figs. 2 and 4, but when he recovered from the induced erysipelas, his face, etc., were almost smooth. He was at once placed on chaulmoogra oil, and is steadily improving. He has gained in weight and strength; the numbness of legs and feet are giving way to returning sensation; he walks with greater ease, and the remains of the tubercles on his face, hands, feet, and legs *have entirely disappeared.*

This experiment, crude in the extreme, was made with a bistoury smeared with blood from an erysipelatous subject, into a tubercle on the patient's forehead; and it came near costing him his life, for the disease that followed was of a most virulent type. This taught a wholesome lesson, and one not soon to be forgotten: *such crude inoculations are too dangerous for application even on lepers.*

Although questioned by some, it is generally regarded as true that leprosy was once almost entirely eradicated from among civilized people, by collecting lepers and confining them in hospitals and asylums erected for such purposes. So universal was this practice—the product of Christian influence—throughout the East during the thirteenth and fourteenth centuries, that it is said: "These buildings almost literally covered the face of the Continent, being numbered by thousands in every country. Every considerable town had one or more of them in its neighborhood, and scarcely a town or burgh in France was unprovided with such an establishment;"[1] and there are very many having to deal with leprosy to-day who believe a return to, and a strict enforcement of, the segregation of former years will, in course of time, rid mankind once more and forever of this the most loathsome of diseases.

It is stated[2] that "Kunsamo, a little town in Finland, was for a long time a small but obstinate focus of leprosy. Sixteen deaths from that disease occurred there between 1774 and 1800, and twenty-two between 1801 and 1828. As the disease appeared to be spreading, it was determined, in 1801, to enforce isolation. A building was erected on a small uninhabited island in Lake Kitkajärvi, and the lepers were removed to that place. There they remained until 1845, when the hospital system was abolished, and the medical officer of the district was instructed to visit the lepers twice a year in their own houses, and to report on their condition to the authorities. These reports were made with regularity for twenty years, during which eleven cases of leprosy came under observation. After 1865 no further reports appear to have been presented, and in 1871 the medical officer reported he was unable to find any more cases of leprosy in Kunsamo. The stamping out, within a comparatively short period of time, of a disease which had probably smouldered on for centuries, may be commended to the attention of the opponents of segregation of leprosy."

[1] American Cyclopædia, vol. x. [2] Brit. Med. Journ., Dec. 19, 1891.

Taché[1] writes: "Since the establishment of a lazaretto, in 1844, leprosy has been more or less kept in check in New Brunswick; and for several years past, especially during the last few years, it has undergone a notable diminution. The check and the decrease are in ratio with the more or less prompt resort to the lazaretto. Segregation is, in my opinion, the cause of the diminution of the disease."

Blanc[2] thinks communities "may rid themselves of this most loathsome, repulsive, and unclean disease, by rigid segregation;" implying thereby a lazaretto as a State institution, wherein lepers shall be properly cared for and interdicted all outside communication involving personal contact.

Münch,[3] being a "contagionist," naturally considers "that the only means for eradicating the disease is the isolation of lepers." He asserts that "isolation of lepers in a given locality stamps out leprosy," and cites many instances in southern Russia, in substantiation of his assertion.

Hellat,[4] member and founder of the Chief Committee for Stamping-out Leprosy, in the Baltic provinces of Russia, finds, in the theory of infection, "the way pointed out by which we may arrive at the annihilation of the disease. As long," he writes, "as it must be looked upon as incurable, isolation alone can lead to the goal."

Goldschmidt[5] says: "Complete isolation of all lepers and their families is the only reliable measure in order to quickly and totally eradicate the contagion . . . and ultimately making this loathsome disease completely disappear."

Wheeler[6] thinks leprosy "can be eradicated by separating the sexes in the asylums."

Roose[7] believes "the rigid system of isolation in vogue in Norway will, in a few years, work complete extinction of the disease" in that country.

Bouchard[8] declares: "Whenever and wherever man has wished to do so, he has been able to liberate himself from the ravages of leprosy, and that it may be entirely extinguished by proper isolation."

Hansen[9] says: "There can hardly be any doubt that segregation is the only right way, at least, after our experience here in Norway," for stamping out leprosy.

"There are grounds for hope for the diminution and even ultimate extermination of 'leprosy' in most parts of the world."[10]

There are those—men of experience in the management of leprosy, capable of forming correct conclusions concerning the disease—who deny that leprosy can be exterminated by segregation; but to particularize their opinions here would but add length to this already too lengthy article, without contributing correspondingly to its interest.

[1] Loc. cit. [2] Loc. cit. [3] Loc. cit. [4] Loc. cit.
[5] Loc. cit. [6] Loc. cit. [7] Loc. cit. [8] Loc. cit.
[9] Loc. cit. [10] Editorial, Medical News, March 7, 1891.

Although contradictory on many important points relating to the "nature of leprosy," it is believed that a proper appreciation of the facts and opinions recorded on the foregoing pages warrant, with reasonable certainty, the following conclusions:

1. That leprosy is a specific disease, due to the presence of the lepra bacilli.
2. That leprosy is influenced by race, climate, soil, food, etc., only in so far as these environments tend to enervation on the one hand, or to physical well-being on the other.
3. That experiments have not demonstrated leprosy to be inoculable on man or beast.
4. That leprosy is hereditary.
5. That leprosy is contagious, infectious, and communicable, under conditions not yet understood.
6. That leprosy is both mitigable and curable.
7. That chaulmoogra oil is a drug of unquestionable value in the treatment of leprosy.
8. That leprosy may be completely eradicated from the list of human ills.

A STUDY OF METHODS OF OBSTETRIC INSTRUCTION.

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A glance over the whole historical period of medicine distinguishes three great epochs: first, that lasting from Hippocrates to Galen—about 600 years; second, that lasting from Galen to Paracelsus—about 1300 years; and third, that of modern times—about 400 years. During the first epoch rational methods of observation and of study, and a true scientific spirit, brought the art of medicine to a high degree of development. During the second epoch medicine slipped back, under the influence of the eclectic methodism of Galen, into a craft for mystics and superstitious priests. Finally, in modern times, medicine has made a renewed progress on a scientific basis of clinical observation and of rational study.

The science and art of obstetrics have passed through the same three stages. Midwifery, as taught in the schools of Greece, and later in those of the Roman world, reached a higher plane, as judged by modern standards, than did its sister arts, medicine and surgery. But in the Dark Ages it sank below the other branches of medicine. The gathered

knowledge and experience of years were forgotten, and the art of obstetrics became the trade of midwifery, and was followed exclusively by ignorant and superstitious women. Midwives had existed practically always, and probably always will exist, and there is no reason inherent in the class which can produce a Marie Lachapelle—no reason why midwives should not practise their profession to the benefit of their patients and to the good of the human race. In modern times obstetrics has been raised again to a plane level with that of medicine and surgery. It and its kindred branch, gynecology, have made very material advances above the conditions that prevailed two or even one hundred years ago.

Among the primitive peoples who gained a livelihood by hunting and by waging war upon their neighbors, the most frequent demands for aid to assist the individual in a medical way were in times of peace undoubtedly of an obstetrical nature. The surgery of wounds would hold a place second only to midwifery, and in times of war might even take precedence, while pathological surgery and the great domain of internal medicine were products of a later advance toward civilization.

In the real progress that has been made in the science and art of medicine in the past fifty years surgery has outstripped all other branches. But following closely, if not, indeed, surpassing surgery in point of progress, gynecology has grown from the merest nothing to be an ideal of aggressive and progressive medicine. Obstetrics lost its primitive pre-eminence before medical history began, not because it became less important, but because other branches developed and demanded equal consideration. To-day obstetrics is a science and an art which shares with surgery the advances gained by the discoveries of anæsthetics and of the aseptic treatment of wounds. Neither surgery nor gynecology requires more nicety and exactness in solving their various mechanical, practical, and theoretical problems of diagnosis and of treatment than does obstetrics in its every-day necessities. Obstetrics is surgical, and in the best sense of the word it is gynecological, and it is more—it is medical. The pregnant and puerperal state may be complicated by any medical disease whatever, and certain of these are, in this relation, strictly obstetrical.

Numerous pleas for the blending of obstetrics with gynecology have been made recently, but obstetrics has been treated always as a secondary matter to gynecology, and but few writers plead for better facilities for teaching and learning the art of midwifery. And yet any gynecological surgeon will acknowledge that the vast majority of the diseases of women coming under his care follow parturition as complication or as sequela. Nevertheless, normal labor, so called, is looked upon by most medical men as something too trivial to demand their time or study. It is true that a large percentage of pregnancies term-

inates favorably to both mother and child; the strain put upon the generative organs by pregnancy and parturition is counterbalanced by the healing art of Nature. Unless the complications arising in the remaining small percentage of cases are serious but little attention is given them by either patient or physician, and lacerations of the cervix and perineum are passed over unnoticed, while displacements and subinvolutions of the uterus are not even appreciated until in later years the woman's existence has become unbearable, and she applies to the gynecologist for aid. The true relationship of obstetrics to gynecology is one of prevention and prophylaxis. Gynecology would be a minor branch to day if the same pains were taken to instruct students in obstetrics as are given to the teaching of surgery, for example. Gynecology and obstetrics should be bound together, or, rather, they should be one, but in this amalgamation obstetrics should take the lead and gynecology should become the secondary and dependent part. Any complication consequent upon a confinement should be recognized, not after the lapse of months, or perhaps years, but immediately the placenta is born the obstetrician should see that all the organs and their functions return to their normal condition.

To accomplish any reform in the practice of this important subdivision of truly preventive medicine it is necessary first to awaken a general interest in routine work in the art; and secondly, to secure to the general practitioner a more thorough knowledge of the science of obstetrics. The standard of obstetric practice should be, and it can be, raised to such a point that gynecological cases may come from unavoidable causes, and not from the ignorance and neglect of obstetric practitioners.

The most fruitful soil to work upon is the undergraduate, and we will now consider the various methods of teaching at present in vogue.

Medical instruction can be divided into two classes: the theoretical, or that of the science, and the practical, or that of the art, of medicine. Theoretical instruction includes the method by didactic lectures, that by reading of text-books, and the method of recitations. The student acquires knowledge in the first by listening to a systematic statement of the subject treated of, and in the second, by reading the same from a printed page. In the recitation this process is reversed, and an opportunity is given the student to express in his own words the ideas that he has gained from a course of reading or of lectures, or from both. In the recitation the student comes into personal touch with the instructor and derives an advantage from immediate and personal criticism which is impossible in reading or in listening to lectures. Practical instruction is conducted by means of "clinical lectures," in which the professor discusses certain patients before a class, and by means of "practical courses" which are a kind of "clinical recitation." In these courses the student himself questions and examines the patient and then dis-

cusses the case with the instructor. Practical courses can be given either in the wards of a hospital or in a dispensary (the "Poliklinik" of the Germans). In general, it is found best to combine hospital and dispensary instruction in the same course, because of the very different kinds of diseases to be found in each—in one, all bed patients; in the other, only those who are able to be out of doors.

Obstetric instruction is conducted on the same general lines, and theoretical lectures, text books and recitations all hold their important place in a well-organized system of obstetric teaching. Instruction at the bedside in hospitals and in out-patient services has also been brought to a high degree of development, although, as will be seen later on, all countries and all schools do not possess equal facilities for teaching midwifery in a practical way. It is as true of obstetrics as of any branch of medicine, that if the best results are to be obtained, no one of these several methods of instruction can take the place of any one of the others. It has been claimed that an out-patient service had no advantage over a hospital-ward service, because all obstetric patients are, of necessity, bed patients, and, therefore, of the same kind. It has also been claimed that a distinct disadvantage rests in such a service, because less personal supervision can be given the student by an instructor in an out-patient service. The refutation of the first objection is well outlined in the *Lancet*, for September 23, 1893,[1] where obstetric teaching in England is discussed editorially, as follows:

> The question is sometimes raised as to whether it is better for a student to attend his case in the outdoor maternity department connected with his medical school, or that he should migrate to one of the lying-in hospitals for the purpose. Each system has its advantages. In the former case he is left largely to his own devices, and the necessity of thinking for himself is obviously of great educational value, if he starts with a fair theoretical knowledge. On the other hand, in a lying-in hospital this sense of responsibility is more or less absent, and though he may in a given time see more cases he may not improbably play no more important rôle than that of a spectator, and consequently be little prepared to act on his own resources in the emergencies that will surely be met with afterward in practice. The advantages of both systems may, perhaps, in the future be combined . . . it would certainly be a great advantage for students to see some cases attended in hospital before commencing attendance on patients at their own homes; but attendance in hospital should not take the place of work in the outdoor department, as in no other way is the faculty of self-reliance so likely to become developed.

The second objection, that students receive too little instruction in out-patient work, can be overcome by supplying a careful system of observing cases, with sufficient instructors to direct the work of the pupils. Just as thorough instruction and supervision can be given in a tenement as in a hospital ward, although a larger staff and an expenditure of more time may be demanded by the "polyclinic" system. A

[1] Lancet, 1893, vol. ii., No. 13.

combination of both systems will most advantageously prepare a student for the practice of obstetrics.

We will now consider in how far different countries fulfil the requirements for giving instruction in obstetrics.

The obstetrical institutions of France are all under government control. Medical students are taught in the wards of the lying-in hospitals, both those that are directly under the control of the Faculty and also those that are independent of the schools of medicine. These hospitals have out-patient departments, which are conducted by midwives specially appointed by the government. Each midwife reserves from her domain certain rooms, not exceeding three in number, for the reception of those patients who may be sent to her. Only cases which will probably run a normal course are thus referred.[1] Certain general hospitals have obstetric out-patient departments likewise run by special midwives. There has been at least one practical obstetric school in Paris for students of medicine ever since the opening of the one in connection with the Hotel Dieu, in 1720.[2] At present the regular obstetric course of the Faculty of Paris lasts one month, and consists of the following courses:[3]

1. Course of twenty-five lessons, in part theoretical lectures, in part practical exercises on the obstetric manikin.

2. Two lectures are given each week by the chief of clinic on cases of dystocia or other cases of pathological interest occurring in the service.

3. A clinical demonstration of any fœtal malformation is given to the students whenever possible.

4. A public obstetric clinic is held twice a week in the amphitheatre.

5. All parturients are delivered by the students under the direction of skilled assistants.

6. The professor is accompanied each morning on his rounds by all the students. The latter are questioned concerning their work of the past twenty-four hours. The cases recently delivered or actually in labor are reviewed and criticised.

7. All the babies born during the week are vaccinated by the students.

The official "law" under which the above course is required is the following rule of the Medical Faculty of Paris, passed in March, 1891: " . . . . each student must take a course in one of the obstetrical clinics of the faculty. The duration of the course is one month, and the student must himself deliver two women during that time." In addition to this required course, the attending obstetricians at the hospitals other than the Faculty clinics, the so-called Accoucheurs des

[1] Pinard: "Du Fonctionnement de la Maternité de Larebolsière," etc., Paris, 1887.

[2] Puschmann: "Geschichte des klinischen Unterrichts," Klinisches Jahrbuch, i., 1889.

[3] Lepage: "Fonctionnement de la Maison d'Accouchements Baudelocque," Clinique de la Faculté, Paris, 1892, 1893, 1894.

Hôpitaux, give private instruction to any students who may apply. It is therefore possible for students to supplement the regular course of instruction by work with special teachers who are paid a fee by the student. Such a course of two and a half months' duration is outlined by Budin[1] as follows:

a. Course of theoretical lessons, including obstetric operations and manipulations on a manikin, is given by an assistant professor.

b. Extra lectures on laboratory work in its clinical application to obstetrics are given by the chief of the laboratories of histology, microbiology, and chemistry.

c. All labors are attended by the students, who write the histories; also pregnant women are examined by them. This course is under the supervision of an assistant.

d. Daily clinical instruction is given in the wards, with criticism of the written histories and oral examination of the students by the professor himself.

e. Work in laboratories is open to advanced students.

f. Most capable students are sent out to assist the midwives in complicated cases occurring in the out-patient service.

The instruction of midwives in France is very thorough and is carried on in all of the lying-in hospitals. Practical courses for midwives had been given in Paris for some time before the founding of the first obstetric school in 1720. After the course of instruction certain of the midwives enter private practice for themselves; others attach themselves to the out-patient departments of the various hospitals, and are paid by the government. Although certain courses have always, since 1720, been open to medical students, it is only within the last few years that they have had equal facilities with the midwife students to work in the obstetric hospitals of France.

This system of instruction has called forth criticism from various French writers,[2] who object to its limitations and who claim that the courses of instruction given by the Accoucheurs des Hôpitaux should be accepted by the Faculty as equivalent to the courses at the Faculty clinics. These critics compare the French with German methods, and draw conclusions unfavorable to France. Lejars[3] thus sums up the German method: "The right to teach is awarded as freely as possible, with the single reservation that an official control is kept with a strict-

[1] Budin: "La nouvelle Maternité de la Charité et l'Enseignement obstétrical" (Leçon d'ouverture du Cours faite le 29. October, 1891). Le Bulletin Médicale, 1891, v.

[2] Champétier de Ribes, Doléris, et Budin: "Rapport fait à la Société des Accoucheurs des Hôpitaux an nom d'une Commission" (Budin, rapporteur), Archives de Tocologie et de Gynécologie, 1891, xviii. Verrier: "De la nécessité de l'Enseignement pratique de l'Obstétrique par la création de Cliniques libres et disseminées et par l'organization de la Policlinique," Nouvelles Archives d'Obstétrique et de Gynécologie, 1886, i.

[3] Lejars: "l'Enseignement de la Chirurgie et de l'Anatomie dans les Universités de Langue Allemande," Le Progrès Médical, 1888, 1889, viii. ix.

ness sufficient to insure a guarantee" (of the character of the course given). These various criticisms have led the authorities to increase the requirements for the Doctor's degree. The Conseil de Surveillance adopted, in June, 1892, the plan for reform in medical teaching as suggested by M. Brouardel, the dean of the Faculty. Article I. of this plan states, among other things, that "During the first two years of the course the students must be connected with the general services of medicine and of surgery. During three months of the third year the students must be connected with the services of obstetrics."[1] The principal improvements in the system of obstetric teaching in France are thus outlined by Ribemont-Dessaignes and Lepage in the preface of their new text-book:[2] "The teaching of obstetrics in France has taken on a remarkable development during the last few years—the formation of midwifery services in many Parisian hospitals, the transformation by the Faculty of the chair of theoretical obstetrics into a chair of clinical obstetrics, the requirement from all candidates for the Doctor's degree of a definite course of work, having increased the facilities for study, to the great advantage of the students."

From the standpoint of medical instruction, Germany and Austria are one. The instruction in obstetrics is given universally in these countries in a so-called "Frauenklinik," which is a hospital devoted to all that is "specifically peculiar to physiological and to pathological woman."[3] The first of these "woman's hospitals" was founded in Göttingen in 1751, and similar institutions were added to nearly all the "schools" in the German-speaking world during the fifty years following. The system of instruction consists of the following courses:

a. Course of theoretical lectures, given by the professor.

b. Touch course on pregnant women, given by the first assistant under direction and personal supervision of the professor himself. These two courses should be finished before taking the remaining work.

c. Practical midwifery course includes the personal care of labor cases and the keeping of the histories of the same. These labors are conducted under the personal charge of an assistant.

d. Clinical lecture, given daily by the professor. The written histories are taken up and criticised, and, when possible, obstetric operations are done before the class, and complications of puerperium and of pregnancy are shown.

e. Obstetric Poliklinik, the out-patient department, renders assistance to midwives in complicated cases occurring in their private practice. The subsequent care of such cases is left to the midwife. An assistant

[1] Doléris: "l'Enseignement de la Gynécologie en France," Nouvelles Archives d'Obstétrique et de Gynécologie, 1892, vii.

[2] Ribemont-Dessaignes et Lepage: Précis d'Obstétrique, Paris, 1893.

[3] Hoffmeier: "Ueber den Unterricht in den Kliniken für Geburtshülfe und Frauenkrankungen," Klinisches Jahrbuch, iv., 1892.

is detailed to do these operations, and he is assisted by one or two of the advanced students.

f. Operation course on the manikin is being neglected in the larger "kliniken." Such a course is still given in the smaller ones.

This system requires of the individual student about two hours daily during two semesters, except when he is on actual labor duty or on the "poliklinik," when all his time is consumed. He is required to give enough time to such duties to allow him to attend to at least four cases of labor. As a matter of fact, many students do more work than this minimum required for the State examination.

The instruction of midwives in Germany is good, and is carried on in some of the "Frauenkliniken" side by side with the teaching of medical students; others of these hospitals are exclusively devoted to the midwives. The course of instruction is modelled on the same general plans on which the students of medicine are taught, except that the whole time of these pupil midwives is given up to the study of midwifery. In a plea for absolute uniformity in these courses Hermann W. Freund[1] draws up the following details:

1. Instruction should last at least nine months—better one year.
2. The general use of a single text-book should be required.
3. Instruction in antisepsis and in the observation and care of normal labors should be considered the principal factor, and the chief weight of the examination should be placed on this.
4. The proper course to pursue with difficult cases, and the methods of antisepsis in private practice should be learned by instruction in "polyclinics," out-patient departments.
5. Instruction on the manikin should be restricted to the smallest possible limits. Version should not be taught.

The most neglected branch of instruction in Germany is the theoretical, and, owing especially to the expressed opinion of no less an authority than Billroth,[2] the theoretical lecture has in some universities been entirely discarded.

The machinery by which obstetric instruction is given in England consists of lying-in hospitals, with usually an out-patient department attached and of out-patient departments connected with the general hospitals, which, as a rule, do not take obstetric in-patients. The majority of the lying-in hospitals and their out-patient departments are entirely concerned with the teaching of midwives and monthly nurses; in some of them, however, the medical student is received as a pupil. Most of the practical instruction of medical students is carried on

[1] Freund: "Die Entwickelung der Deutschen Geburtshülfe aus der Habammenkunst," Klinisches Jahrbuch, 111, 1891.

[2] Billroth: "Lehren und Lernen der medicinischen Wissenschaften an den Universitäten der Deutschen Nation," Wien, 1876.

in the out-patient "lying-in charities" of the general hospitals. The system of instruction has consisted of:

I. Course of theoretical lectures.

II. Practical course in which the student is required to attend from six to thirty cases, according to the licensing body to which he proposes to apply.

Most students receive a greater credit from their practical course than the maximum required by any licensing board. The course of theoretical lectures varies in length from three to six months, and is very generally the latter. The practical course usually lasts one month, and includes the examination of pregnant women as well as the care of parturients and puerperæ.

There have been many criticisms of this system by various writers in the English journals. Dr. Wm. L. Reid,[1] Physician to the Glasgow Maternity Hospital, objects to the system because the majority of students take their midwifery lectures in their fourth winter, while they take their practical courses during their second or third summer or autumn; because, further, while some read for the latter, others do not, but "trust to first seeing a case with a student who has already attended one or two cases." This critic has been in Berlin, where he was pleased with the methods of Karl Schroeder, and the following attempt to adapt German methods to the English system is interesting. Reid gives the following ideal course of instruction:

> Systematic course first, then practical course. The student should call once or twice a day at a lying-in hospital during a fixed period, until he has watched six cases pass off in the labor-room under the care of the house surgeon or head nurse. At this stage, also, he should practise palpation, learn to pass the catheter, and with great precautions be taught diagnosis by touch. He should then, along with another student, be sent to outdoor cases, each case being visited during or soon after labor by the outdoor surgeon. He ought to attend a dozen such, sending for the district physician when anything beyond the ordinary is observed. A clinical lecture should be given three times a week during the summer, or both summer and winter, and all the students should find it to their interest to attend. These lectures ought to be purely clinical, and refer to the cases which the students are seeing along with the physicians every forenoon in the wards. When the outdoor or district physician is called to a case, he should attend the next clinical lecture, sending the lecturer a short note of the facts beforehand. The students who attended should be asked to give an account of the case from beginning to end, and the lecturer should ask questions of them or other members of the class, and make a running commentary. In case of doubt as to fact, the physician who had consulted with the students would be then and there referred to.

Dr. Robert R. Rentoul,[2] writing four years later, points out the lack of uniformity in the requirements for medical students, varying from

[1] Reid: "The Clinical Teaching of Midwifery and the Diseases of Women," Edinburgh Medical Journal, 1886, xxxii.

[2] Rentoul: "The Training of the Medical Student in Midwifery." Lancet, 1891, i.

nothing at all at Oxford to that of a six months' theoretical course and thirty labors, as required by the Royal College of Physicians of Ireland. More in detail these requirements are shown in the following table:

Name of examining body.	Lectures on midwifery, etc.	No. of labors required.
Royal College of Physicians and Surgeons, Eng.	3 months.	20
Society of Apothecaries (London)	3 "	20
University of London	1 course.	20
" " Oxford	0	0
" " Cambridge	1 course.	20
" " Durham	3 months.	20
Victoria University	6 "	20
Royal Coll. Surg. and Apoth. Hall, Ireland	6 "	30
Royal Coll. Phys. and Surg., Ireland	6 "	30
Royal University, Ireland	6 "	20
University of Dublin	6 "	Not stated.
Royal Coll. Phys. and Surg. Edin., and Fac. Phys. and Surg. Glasgow	3 "	6
University of Edinburgh	6 "	6
" " Glasgow	6 "	12
" " Aberdeen	3 "	6
" " St. Andrews	3 "	6

This writer states that midwives receive a more thorough instruction, and suggests these reforms: First, that lying-in hospitals should have paid district medical officers, who would each have a senior pupil under his immediate charge, and, secondly, "each student should be required to attend for three months indoor practice of a lying-in hospital or to have been present at not less than twelve confinements, at least three of which he should have conducted personally under the direct supervision of a registered practitioner." Finally, a recent editorial in the *Lancet*,[1] already quoted from, discusses this matter in the same spirit. The certificate required by the examining boards can be obtained by service in the out-patient department of one of the general hospital medical schools, or from any legally qualified practitioner to whom the student may act as an assistant, or thirdly, by becoming a resident pupil in a lying-in hospital. After showing the errors of giving too little instruction, which can so easily creep into an out-patient service, the article continues:

> Of late years, at many of our schools the system has been greatly altered. It is for the most part, we believe, no longer possible for a student to have his name placed on the list of maternity pupils on the strength of a merely perfunctory attendance on a course of midwifery lectures. He is required to show that he has profited by it, and, in some schools at all events, students are not allowed to attend their cases till they have satisfied the obstetric physician in charge of the maternity department by the test of actual examination that they have acquired a sufficient knowledge of elementary midwifery, and more especially of that part of it relating to the observance of antiseptic principles.

[1] Lancet, loc. cit.

The growing tendency in England to combine teaching in the wards of a hospital with work in an out-patient department is shown by the following statement:

> The experiment that is about to be tried at St. Mary's Hospital, of establishing lying-in wards for the reception of lying-in women as in-patients, will therefore be watched with much interest, and should it prove successful, as we trust it may, a similar plan will no doubt be generally adopted by the other medical schools.

In the remaining countries of Europe similar systems of teaching are carried out. Russia, Hungary, Switzerland, and more recently Italy, are very largely under the influence of Germany and Austria, and the German methods of accurate observation and of strict attention to detail have been more or less completely and successfully transplanted to the rest of Europe.

In this country the medical schools and most hospitals are not supported by the Government, and the intimate relationship that exists in Continental Europe between the universities and hospitals, both being Government institutions, is not possible here. Our schools are private corporations, like the universities of England. Unlike the English schools of medicine, however, they possess no great hospitals, and any plan of clinical instruction proposed by the Faculty must be subject to the approval of the separate Board of Trustees who may at the moment control the hospital in which it is the good fortune of the particular professor involved to hold the position of attending physician. All the medical schools of this country conduct a more or less complete out-patient or dispensary service, and the richer institutions have buildings especially devoted to this important department. Bedside instruction and general clinical lectures are also given by the vast majority of professors of practice and of surgery in some neighboring hospital; and such fact is very much to the credit of the trustees of those hospitals, for they share in no way the fees of the students.

The system of obstetric teaching varies very much in different localities. In some States there is as yet no examination at all required of candidates for a license to practise, but the possessor of any degree of Doctor of Medicine is given such a permit upon the simple payment of a registration fee. In other States an examination is now required, but in no State does the law require more than a theoretical test of the applicant's ability to manage scientifically a case of midwifery. The States having thus neglected to enforce any practical obstetric training from their qualified physicians, all progress in this direction has been left to the medical schools, and every advance has resulted from competition between rival institutions.

The course of theoretical lectures as given in our best medical schools leaves nothing to be desired, neither in its supply of diagrams and

models nor in its collections of museum specimens. The best text-books by American and English authors, and good translations of the most recent German books, are also in the hands of our students. In addition, a good system of recitations either forms a part of the regular course or is sought by the student in a private arrangement between himself and his instructor. It is in the matter of practical obstetric work that our schools are weak. The nearest approach to such work given in the large majority of our schools is a course on the obstetrical manikins of Schultze and of Budin. A very complete and carefully detailed series of lessons on these manikins is now almost universally given; that described by Edgar[1] is a very good example of them all. But such instruction is really only theoretical, and can never educate the sense of touch to differentiate the many phases of the pregnant and puerperal state. The proper delicacy of perception can only be procured by the frequently-repeated examination of obstetric cases in all the stages of labor and of the pregnant condition. The manikin has already been classed with old-fashioned methods by the teachers of the most progressive medical country, Germany, especially by those who command the use of a numerous *clientèle* of patients.

In all the large cities of the United States there are a sufficient number of lying-in institutions to more than care for the patients who apply; but the number of these which give any instruction to medical students is small indeed. Out-patient departments devoted to obstetrics are much less common than maternity hospitals, but they are a recent development, and most of them were started for the main purpose of giving clinical instruction. In New York City, for example, there are at least thirteen institutions which have a lying-in department or which are wholly devoted to such work, and only five of these give any instruction whatever. Four out of five instruct the students of a single college only. Most lying-in hospitals give a very satisfactory course of practical work to nurses who come fromthe great training-schools of the general hospitals, but the future physician is sadly neglected. In American medical schools, the system of instruction in obstetrics reserves no place for the clinical lecture nor for the frequent criticism by the professor of work done and recorded by the student, and only exceptionally is there any provision for the student personally to conduct cases of labor or to examine pregnant women or to watch a patient and her baby through the puerperal period.

There is no instruction open to midwives in the United States, and it is left entirely to the local boards of health whether they will accept the registration fee of any particular applicant. This country is more than a century behind Europe in its lack of control of the midwives

[1] Edgar: "The Manikin in the Teaching of Practical Obstetrics." New York Medical Journal, 1890, lii.

who practise in our great cities. During 1892 there were 67.39 still-births to every 1000 of puerperal cases in New York City; in the report of the Board of Health for that year, Dr. John T. Nagle,[1] the Register of Records, comments on this fact thus:

> Schools for instructing midwives seem to be essential in this city . . . More adequate measures (*i. e.*, more than afforded at present by the Maternity hospitals and kindred institutions) are needed in this direction, and it would seem that if they (such institutions) combined to form a large Maternity hospital, in connection with a school that would give theoretical and practical instruction in obstetrics, it would be a desirable measure and supply a necessary want.

The medical profession has escaped from a similar degeneration and lack of development only by the educational trips to Europe of some of its individual members, during which they have acquired all that was good in the countries visited. There has arisen in consequence a popular feeling that a trip abroad is a necessary ending to perfect a medical education. And in fact, the number of English-speaking students who collect each year in Vienna has led some of the "privat-docents" of that city to give practical courses, in which the instruction is conducted wholly in the English language. Many writers in our journals call attention to the advantages of the obstetric courses in Dublin, Prague, or other European medical centres,[2] but few have anything to record concerning the establishment of similar methods in this country. There are some notable exceptions to this rule of general mediocrity in American methods of obstetric teaching. Dr. Rohé, of Baltimore,[3] calls attention to the College of Physicians and Surgeons of that city as the pioneer medical school to found a lying in hospital for the principal purpose of giving instruction. This was in 1874, and this hospital consists now of both an in-patient and an out-patient department. In Philadelphia the same combination of hospital and dispensary has been in use since 1887, *cf.* Parvin.[4] And Edward Reynolds[5] has described in detail the methods of Harvard University, in connection with which schools the out-patient service of the Boston Lying in Hospital was established in 1881. In New York City there are three undergraduate medical colleges and one medical college for women. All of these require practical courses in obstetrics. Two of these medical colleges require such work only in out-patient service, while each of the two remaining institutions possess a special lying-in hospital, and their students are instructed exclusively in the wards of these hospitals. The

[1] Nagle: "Report to President of Health Board." City Record, February, 1894.

[2] Kelly: "The Opportunities Offered by Prague, Heidelberg, and Dublin to the American Medical Student." International Medical Magazine, 1893, ii.

[3] Rohé: "The Practical Teaching of Obstetrics in the United States." Transactions of the American Association of Obstetricians and Gynecologists, 1890, iii.

[4] Parvin: "The Necessity for Practical Obstetrics in the Course of Instruction given by Medical Schools." The College and Clinical Record, 1888, ix.

[5] Reynolds: "Modern Methods in Teaching Clinical Obstetrics," Boston, 1889.

courses given are a great advance beyond the methods of a decade ago, and we simply offer the criticism that no one of them possesses the ideal combination of an in-patient and an out-patient service. Other schools have also improved the courses given in this department, but much remains to be accomplished. The facilities of learning practical midwifery in this country should be equal to those of any other; and it should be the boast of our schools that the only thing not taught here and to be learned better abroad is the German or the French language, and not any detail of the science or art of medicine.

If we were to outline an ideal course of obstetric teaching we would choose:

1. Theoretical lectures as given in the United States.
2. Recitation system as practised in the same.
3. Manikin course as given in France, Germany, and very generally in America.
4. Touch course on pregnant women as universally conducted in France and Germany, at present beginning to be used in the United States.
5. Practical work in hospital wards, not limited to simple observation, but each student actually to carry on the labors and their subsequent treatment under rigid supervision.
6. Clinical lecture on the same material as given in France and Germany, and almost absolutely neglected in America.
7. "Polyclinic" or out-patient department as carried on in England and partially introduced into the United States.

The general result to be gained is: First, as thorough a theoretical knowledge as possible by the first three theoretical courses just outlined above. Secondly, the student should receive as complete a practical application of this knowledge as may be by seeing experts conduct confinement cases. Then, by doing the same under expert direction in hospital wards, where every facility for cleanliness and nursing is at hand, his flagrant errors would be corrected and his unskilled hand begin to appreciate minute details. He should finally put in practice in the tenements, but under careful supervision, the principles he will have learned. This object should be accomplished by the four final practical courses of the ideal system already outlined.

The questions involved in any plan for instructing midwives are similar, but infinitely more difficult to answer. The deepest foundations on which to build up a system are absolutely wanting. The first help should and must come from the State. A law compelling midwives to give evidence of some little knowledge to the local boards of health would compel these women to seek an elementary education in midwifery. If the demand should thus be created the proper schools would soon follow. The raising of the standard of requirements for registration would then become a mere matter of subsequent detail.

REVIEWS.

A Text-book of Diseases of the Ear and Adjacent Organs. By Dr. Adam Politzer, Imperial-Royal Professor of Aural Therapeutics in the University of Vienna; Chief of the Imperial-Royal University Clinic for Diseases of the Ear in the General Hospital, Vienna. Translated into English from the third and revised German edition, by Oscar Dodd, M.D., Clinical Instructor in Diseases of the Eye and Ear, College of Physicians and Surgeons, Chicago. Edited by Sir William Dalby, F.R.C.S., M.B., Consulting Aural Surgeon to St. George's Hospital, London. Octavo, pp. 748. Lea Brothers & Co., 1894.

It is more than ten years since the former English translation of Professor Politzer's text-book; and while that work comprised some of the improvements of the following German edition, its excellences have been far surpassed by the new presentation of the teachings of the Vienna master. He must always impress his students with the broad catholicity of his views and his combination of unceasing aggressive advance with sane conservatism of judgment. So it is to be expected that this work, largely re-written, should be a safe and elaborate guide into every part of otology.

The scheme of the work has been recast, with transposition of some chapters and sections into more systematic sequence; and the use of smaller type for the less important sections gives considerable economy of space and renders less conspicuous the large additions made. The series of illustrations, previously rich and notable, has been increased by seventy-five, with substitution of new and better for not a few of those before acceptable. Many of these are from the author's exquisite drawings for his *Dissection of the Organ of Hearing;* but we note with regret and some mortification that the reproductions in the English version are often decidedly inferior to the German.

The admirable anatomical chapter with which the work opens has been amplified in relation to the tympanic attic and other points of growing practical importance, and the physiology is similarly dealt with. The chapter on the tests of hearing has been entirely changed, and a very full, judicial presentation of the value of the tuning-fork for testing sound-conduction by air and by bone brings the matter fully up to date. He upholds the usual trustworthiness of Weber's and Rinne's tests, and cites all of the useful modifications, such as Gelle's "pressions centripètes" and Bing's "entotic" method, including his own proof of the patulency of the Eustachian tube, when the tuning-fork sounding before the nose is more loudly heard on swallowing. Too much study can hardly be expended in this difficult field, where much remains to be elucidated, since thus only can proper classification of

cases be possible and the aggressive resort to surgical intervention become less empirical and more successful.

The clinical chapters upon disease of the auricle, external canal, and drumhead show minor changes and additions; but in those upon the catarrhal inflammation of the tympanum, especially of the chronic adhesive type, he embodies his important later anatomical and pathological studies as to the ossicles and fenestra of the labyrinth, which deserve the widest recognition and consideration. With the parallel studies of Blake, Bryant and others, they throw the most valuable light upon the subject, and point most clearly to the stapes and its connections as forming the keystone of the conducting apparatus and its lesions. The value, as well as the limitations of the long-tried methods of inflations, injections by catheter, and pneumatic massage, are well set forth, undisturbed by the tirades of reformers who have been offering us panaceas which they imagine to be new; but he enters fully into the question of operative interference, in which he has been one of the pioneers, as well as a critical follower of others, and decides that, while some of the measures are fully exploded, others can be regarded as justifiable experiments.

The suppurative diseases of the middle ear, with a threefold division into muco-purulent, acute purulent, and chronic, receive still fuller consideration than heretofore, with stress upon the "attic suppurations" and cholesteatoma formations. These are illustrated by most instructive new pictures, as well as by the wealth of previously published sketches. The peculiarities of the aural involvement in the various infectious diseases are treated at length, at the same time that due emphasis is laid upon the responsibility and the need for more adequate attention on the part of the general practitioner.

In the usual treatment syringing is given its deserved position of first importance; but the reviewer must earnestly protest against the temperature advised, 26–28° C. = 78–82° F. In no case should the fluid be below 100° F.—the probable temperature of an inflamed ear—while increase to 105° is generally pleasant. Above this we obtain the stimulating effect of the heat, securing a tonic application superior in the majority of cases to any of the medicinal additions which he cites. In the very obstinate chronic otorrhœas showing much mucous admixture he warmly recommends adding a few drops of "oil (not spirit) of turpentine." It is surprising to find, as in other European text-books, almost no reference to the peroxide of hydrogen as a cleansing agent; and the delicate cotton-carriers, much used here as a means of applying it and doing a hundred other valuable things, seem unknown. "I have never observed bad results from the use of boric powder," summarizes one side of the contention as to the dry treatment, while he shows the limits within which its use is to be commended. He is also in favor of the alcohol treatment, often adding boric or other medicaments, and still regards tr. ferri chlorid. as the most efficient cauterant to granulations.

Operative methods of dealing with the suppurative disease and its disastrous effects are considered in detail, and the opening of the attic by the removal of the Rivinian margin is advised when the process is limited to the external attic, unless the accompanying caries of the ossicles is extensive. He warns against removing the ossicles, if but slightly carious, when the hearing is fair, as it often is in the Shrapnell-perforation cases, but advises their excision when they are demonstrably

diseased beyond functioning or probable healing. He reserves to the severer cases Stake's method of combining the chiselling free of attic and antrum with extraction of the malleus and incus, doing the simpler operation as a first step in the others. In dealing with the acute inflammations of the mastoid he thinks that Wilde's incision may be occasionally useful, but only in the class of cases which generally do as well with the antiphlogistic measures. Of these he prefers cold mediate irrigation with Leiter's coil. In the cases resisting conservative methods, especially those occurring in influenza, he opens the bone as soon as any operative intervention is demanded. In many of the acute cases he has found only the cells toward the mastoid tip involved; so he condemns needless opening of the antrum, and operates lower down. In the chronic cases penetration to the antrum is more generally demanded, and he selects the area close behind the "spina supra meatum," and chisels carefully, layer by layer, until the pus-cavities have been opened and evacuated. A fruitless operation should not be carried deeper than 18 mm.; the external opening should be free, so as to give good access and view; irrigation and minute cleansing should be performed, and drainage secured by tube and packing. Exposure of dura and sinus should be avoided by careful operation, although not apt to be serious complications, and the procedure should be modified in accordance with the needs and limitations of the case.

The sections upon sinus thrombosis, brain-abscess, and other serious or fatal extensions of tympanic suppuration needed little change from their former completeness, but have been extended to comprise all that is latest and best as to the operative interventions in these matters. These procedures are minutely but concisely described, the chisel and mallet being preferred to the trephine; and the author speaks from considerable personal experience, as well as study, in giving the complications and results.

The section upon nasal disease is excellent but brief. Nasal work has been as often neglected by the aurist as overdone by the laryngologist, and between these extremes Politzer keeps a good middle course, and much sound teaching can be found in and between his lines.

The final chapter on the internal ear is well expanded to bring it fully to date, and with notes upon mutism, aids to hearing, and indices of literature and of the contents, round up what is the best expression in English of current otology.

The translating has been well done, but is not free from blunders, such as "*oblique* (low) position of the cerebral fossa," "the *feathered* (spring) probe of Lucas," the oval opening is *on an axis* (at right angles) with the curve of the catheter," "*axis* (crus) of the stapes." He retains such German words as *ambos*, sounding, and follows the original in giving the weight of the incus as 0.25 gm., instead of 0.025.

B. A. R.

A TEXT-BOOK OF THE DISEASES OF WOMEN. By HENRY J. GARRIGUES, A.M., M.D., Professor of Obstetrics in the New York Post-Graduate Medical School and Hospital; Gynecologist to St. Mark's Hospital, New York City; Gynecologist to the German Dispensary; Consulting Obstetric Surgeon to the New York Maternity Hospital, etc. Containing 310 engravings and colored plates. Pp. 690. Philadelphia: W. B. Saunders, 1894.

WE are glad to welcome another distinctively American work on gynecology by an author whose name is a synonym for candor, wide research, and scientific accuracy. A careful perusal of the book will convince the reader that his purpose, as set forth in the preface, "to write a practical work," has been clearly kept in view throughout. A glance at the copious footnotes alone shows how minute has been his study of current American literature, and is calculated to awaken no little pride in the fact that our countrymen have contributed so much to the progress of gynecology during the past fifteen years. The author's distinct aim to emphasize this fact will alone win for him a host of sympathetic readers.

The general arrangement of the book is as follows: Under a "general division" are included eight parts, the first three of which deal with development, anatomy, and physiology; separate chapters under the latter heading are devoted to puberty, menstruation and ovulation, copulation, fecundation, and the climacteric. It is hardly necessary to state that the chapter on anatomy (including seventy-eight pages) is a model of conciseness and accuracy, through which are interspersed many novel views and the results of the author's original investigations, as well as researches.

In the section on physiology considerable prominence is given to recent views on menstruation and ovulation. The writer believes that menstruation may persist after double oöphorectomy, even though no ovarian tissue has been left behind. We are glad to see that he regards the possible presence of a third ovary in these cases as problematical; Sutton positively denies the fact. Some criticism may be urged against such short chapters as those on copulation and fecundation (page 120), which might readily have been combined; the same peculiarity is noted elsewhere. The chapter on the climacteric is thoroughly practical and most useful to the student. The same comment applies to the succeeding section on etiology, which contains a large amount of information in a remarkably clear, though condensed, form.

Part V., on "Examinations in General," is lucid and complete, presenting just such information as the practical clinical teacher finds best adapted to post-graduate students. Part VI., on "Treatment," contains such a variety of subjects as to be a little confusing. We regret that it is not divided into several chapters treating of non-surgical and surgical treatment, technique, and instruments. The local treatment recommended is wisely conservative. We hope some day to see the double-current catheter banished from the gynecologist's armamentarium. Fig. 147, representing the vaginal tampon *in situ*, is misleading, as it tends to give the beginner an erroneous idea with regard to the size and firmness of the tampon as described in the text. Under the paragraph

on tamponade of the uterus it would have been well to add the caution that the cervical canal should first be dilated. Undue space is devoted to a description of ligation of the uterine arteries, an operation which is somewhat out of place in this chapter, and one which we would advise none but an experienced surgeon to attempt.

The descriptions of operative technique, the preparation of the patient, sutures, etc., are clear and concise. Advanced surgeons may object to some of the writer's methods, especially to his preference for the use of antiseptic solutions during an operation. The cuts of instruments are good, though some are now a little antique (Figs. 170, 172, 173). The writer is not much in favor of combined operations, though his argument against the simultaneous performance of the cervical and perineal operations—fear of secondary hemorrhage or premature menstruation—is not borne out by practical experience. This chapter concludes with several pages on gynecological electro-therapeutics, in which careful directions are given with regard to the practical application of the different kinds of electricity.

Part VII., on "Abnormal Menstruation and Menorrhagia," is referred to apologetically in the preface as treating of symptoms rather than true pathological conditions. Nevertheless, we find much that is useful and instructive in the seven short chapters into which it is divided. Leucorrhœa forms a separate "part" by itself.

The "special division" comprises two-thirds of the book, including seven parts, thus divided: Part I. (eighteen chapters), "Diseases of the Vulva;" Part II. (four chapters), "Diseases of the Perineum;" Part III. (thirteen chapters), "Diseases of the Vagina." Following these are thirteen chapters, under Part IV., on diseases of the uterus, ten on affections of the tubes and ovaries, and a concluding section on "diseases of the pelvis," with an appendix on sterility. A mere review of the table of contents renders it evident that the entire field of pelvic diseases has been covered, down to the smallest details, in a scholarly and systematic manner. It is impossible to do more than to indicate briefly the author's general plan and to call attention to a few of the salient points which prove its usefulness as a modern text-book.

The various affections of the vulva are well treated, largely from a clinical standpoint. We note in passing that the writer leans to Morris's theory that adhesion of the preputium clitoridis is a cause of various reflex neuroses, and that (contrary to the position taken in other recent text-books) he does not regard lupus as identical with tuberculosis.

Chapter XVIII., on "Masturbation," is a useful contribution to a subject on which most writers show a curious reticence. We disapprove (in common with most gynecologists) of clitoridectomy, which the practical experience of every surgeon who has performed it since Baker Brown's day has shown to be, except in rare cases, a useless mutilation. Under "diseases" of the perineum (somewhat of a misnomer) are included descriptions of the various methods of perineorrhaphy (especially Emmet's), which are concise, but clear and intelligent to the general reader —a rare virtue in such articles. The influence of the author's wide obstetrical experience is brought to bear most happily in his studies of laceration of the perineum and its treatment, the result being distinctly better than if he had viewed the subject from a purely gynecological standpoint. He has certainly grasped the real idea of Emmet's opera-

tion better than most recent writers. The accompanying diagrams are especially helpful to the beginner.

Chapter II. (page 314), entitled "Garrulity of the Vulva" (including ten lines) spoils the effect of the preceding one. If worthy of mention at all, it is in no sense a "disease," being merely a symptom of relaxation of the vulva, as explained in the context. Coccygodynia is rather out of place in a section on injuries of the perineum; it is a question if any but surgical treatment is effective in this affection.

Under the sections on diseases of the vagina is included a chapter on the various fistulæ; nearly twenty pages are devoted to the latter subject, a number of plastic operations being described and figured. Of the one hundred and twenty-six pages which are assigned to diseases of the uterus, displacements and neoplasms claim fifty each. Laceration of the cervix receives careful attention, the author being evidently firmly convinced of the pathological importance of the lesion (especially its reflex phenomena), which recent authors are inclined to regard as trivial. We agree with the recommendation to operate in the *dorsal* position, which is a decided advantage when perineorrhaphy is performed simultaneously —a procedure that the author believes is "risky" (!). In Chapter IV., on "Metritis," the old stumbling-block of students appears—the confusing subdivision of the various inflammatory conditions according to their seat, into "acute" and "chronic" metritis, and of the former into "endometritis," "parenchymatous metritis," "cervicitis," and "endocervicitis," which is, of course, correct enough from an anatomical standpoint, but is none the less perplexing to the beginner. We hesitate to criticise such an accurate observer and experienced teacher, and our criticism must be understood as being made purely from a clinical point of view. We do not undertake to decide the vexed question of the propriety of describing so-called hyperplastic endometritis as a chronic inflammation, rather than an *end-process*. We also hold that "benign adenoma" is a distinct form of neoplasm, not to be confused with endometritis fungosa.

The chapter on displacements in every work on gynecology is in a certain sense an index of the author's originality and freedom from the influence of views which depend for their currency on their antiquity rather than their inherent reasonableness. Applying this test, it is a little disappointing to find that Dr. Garrigues, still retains, though not very enthusiastically, the venerable cuts of anteversion pessaries, instruments which we venture to say most American gynecologists now regard only as curiosities. The prophecy of Hart and Barbour, made ten years ago, has been fulfilled: "Probably in a few years, anteversion will cease to be considered among uterine displacements." In speaking of the surgical treatment of anteflexion, the writer utters a timely caution with regard to the dangers of the intra-uterine stem—which he prefers to use, if at all, when the canal "re-contracts" after forcible dilatation. The section on retro-displacements covers the ground pretty thoroughly, including concise descriptions of the various recent operations for the cure of retroversion.

The operative treatment of uterine fibro-myomata is considered at length, the author showing a thorough familiarity with all the recent methods of extirpation and supra-vaginal amputation. Enucleation of large sessile tumors with the spoon-saw has been abandoned; it is a more than questionable procedure, even in the hands of an expert, and

the author properly emphasizes its dangers. Malignant disease of the uterus is well treated from a clinical standpoint.

Part V., on "Diseases of the Tubes," is well adapted to the needs of the student by reason of its clearness and general conservative tone. Some of the opinions expressed, as well as those quoted from other sources, have, it should be stated, been greatly modified during the past five years. The writer evidently does not subscribe to the modern view that true hæmatosalpinx is rare, except in connection with ectopic gestation. The operative technique is carefully described.

Part VI., including nearly a hundred pages, forms a complete monograph on diseases of the ovaries, which equals, if it does not exceed, the corresponding section in the best works on diseases of women. The portion devoted to ovarian cysts and ovariotomy is quite exhaustive, and will prove valuable to the most experienced reader.

The concluding section deals with affections of the pelvic peritoneum, including diseases and neoplasms of the ligaments and hæmatocele.

The table of contents and indices are unusually full and accurate, and the remarkable freedom of the text from typographical errors is characteristic of that minute, painstaking revision for which the author is noted. The general appearance of the book is pleasing and the illustrations, many of which are original, are clear and well chosen. It is in every sense a *safe* text-book to place in the hands of the student and general practitioner, while the style is so lucid, concise, and forcible that no one can misunderstand a single statement. When we have said this, and have added that the book reflects throughout the modest tone of true worth, we feel that we have described as well as we could have done in several pages a work in which we should feel a pride as the exponent of what our countrymen have accomplished in gynecology during the past decade, as well as a striking evidence that patient research and scientific accuracy are not confined to the Continent. We prophesy for Dr. Garrigues' book a popularity which will be as great and as well founded as are its intrinsic merits. H. C. C.

A Text-book of Practical Therapeutics. With especial reference to the application of Remedial Measures to Disease and their Employment upon a Rational Basis. By Hobart Amory Hare, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. With special chapters by Drs. G. E. de Schweinitz, Edward Martin, and Barton C. Hirst. Fourth edition, thoroughly revised and much enlarged. Pp. xi., 740. Philadelphia: Lea Brothers & Co., 1894.

The fourth edition of this work comes before us enlarged to the extent of forty-four pages, the more important changes being found in the part devoted to the consideration of drugs. The new sections added are: Boroglycerin, bromoform, chloralose, condurango, convallaria, duboisine, methyl and methylene-blue, naphtol, pyrogallol, solanum Carolinense, soya beans, starch, zinc, and sodium sulpho-carbolates, thallin, trichloracetic acid, trional and tetronal. Nor does this list comprise all the

additions, for changes are found upon almost every page. Errors in alphabetical arrangement and the duplications in the last and former editions have been corrected. In the part which treats of remedial measures other than drugs, enteroclysis, hypodermoclysis, intravenous injection, lavage, mineral springs, and climate, in addition to the subjects of the last edition, are considered. The treatment of various diseases has been modified and somewhat extended. The doses of medicines are now given in both the apothecaries' and the metric system. Although some of the omissions and inconsistencies to which notice was called in our review of the third edition have been corrected, others have not received attention. The statement that this edition "has been revised in such a way as to render it uniform with the new U. S. Pharmacopœia" is not strictly true, so far as nomenclature is concerned. The majority of names of chemicals follow the old instead of the new Pharmacopœia, *e. g.*, bromide of potassium for potassium bromide. Nor, indeed, is the author accurate in terms which are presumably intended to be precisely those of the Pharmacopœia, for on page 262 we find naphthalinum instead of naphtalinum, and on page 110 camphor monobromate and monobromate of camphor appear instead of monobromated camphor; adeps lanæ hydrosus should have been found alphabetically as such in place of lanolin (p. 232), and the same may be said of chirata for chiretta (p. 128) and of rhamus purshiana for cascara sagrada (p. 123). Some pharmacopœial drugs and preparations are omitted—for instance, viburnum. Errors in statement are infrequent, yet morrhuol is said to be "a crystalline substance containing phosphorus, iodine, and bromine" (pp. 160 and 161), while, as a matter of fact, it owes its rctivity to the cadaveric alkaloids of cod-liver oil. Incompleteness carely marks the treatment of a subject, but the mention of the pharmaaopœial hydrastinine hydrochlorate (p. 205) should have been followed by a statement of the conditions for which it is employed. Tetanus does not require treatment "virtually identical" with that of strychnine poisoning (p. 648); in this section the recent literature should have been considered. On pages 170, 171, and 651, other preparations and methods of administering creosote might well have been stated. Cactus preparations (p. 102) to possess therapeutic value should be made from the green plant. Evidently the author believes that constipation is a symptom peculiar to women (p. 469), or else that massage is efficient only when applied by them, if one may judge from the use of the feminine noun. The proof-reading is excellent, an occasional error, as sparteine sulphide for sulphate (p. 678), being met with. Many prescriptions are written in full; it would undoubtedly be an improvement if all abbreviations were replaced by full terminations; the medical student should be correctly taught, so that in later life he may avoid careless abbreviations. On the whole, the book is a faithful portrayal of our present therapeutical knowledge; the diction, an occasional inelegant expression being excepted, is good. The alphabetical arrangement is not likely to commend itself to the average medical student, who probably will wish to know the relationship of drugs, as much as it will to the practitioner, who seeks to refresh his memory. As a work arranged alphabetically we regard it as an excellent example, and well meriting the favor with which it has been received by the profession.

R. W. W.

LES CENTRES CÉRÉBRAUX DE LA VISION ET L'APPAREIL NERVEUX VISUEL INTRA-CÉRÉBRAL. Par le DR. VIALET, Ancien Interne des Hôpitaux de Paris. Avec une Préface de M. le Dr. Déjérine, Professeur Agrégé à la Faculté, Médecin de l'Hospice de Bicêtre. Ouvrage orné de 90 figures dont 20 dans le texte et 70 en phototypie hors texte, par H. Gillet et Vialet. 8vo., pp. 355. Paris, 1893.

[THE CORTICAL CENTRES FOR VISION, ETC.]

THIS volume of more than three hundred and fifty pages practically presents the outcome of extended and most painstaking microscopical research amongst a number of previously reported clinical cases that had been most carefully studied at Bicêtre by Déjérine.

The first case was one of pure cortical hemianopsia, the field defect belonging to the left homonymous type. In this instance there was an old yellowish plaque of partial softening which was limited to the anterior fourth of the right cuneus. The second case was one of the same type, except that here the field-defect symptom was reversed. Microscopic section showed that the entire left cuneus was softened. The third, which was distinguished by Déjérine as a new form of word-blindness, under the category of "cécité verbale pure," was most interesting. This patient suffered from a defect which involved the right side of the visual field. Whilst unable to read or to write anything that was exposed to his eyes, he could write from dictation. In this case autopsy revealed an old plaque of degeneration in the base of the left cuneus, the posterior parts of the lingual and fusiform lobes, the internal temporo-occipital furrow and the border of the corpus callosum. The other two cases, which were cases of ordinary word-blindness with hemianopsia, exhibited lesions in the small secondary annectant convolution in the fissure between the first and the second occipital convolutions.

To this study the author has coupled a fair bibliography, with a brief recital of the salient points in each instance, of the most important cases in the literature of the subject that have been carried to autopsy. This portion of the work, which is given chronologically, is divided into two groupings. The first of these is where the gross macroscopic appearances of the lesions have been studied, and the second is where additional microscopic evidence has been furnished. In the first series, he enumerates some seventy-three cases which occurred from the year 1863 to the year 1889. In the second he finds but fifteen cases—these, in great part, being the classical ones of Von Monakow and Henschen.

The cortical centre for vision occupies all of the internal face; it is limited in front by the internal perpendicular fissure; above, by the superior border of the hemispheres; beneath, by the inferior border of the third occipital convolution; and behind, by the occipital pole. He believes that the centre of this visual area coincides with the calcarine fissure, and finds abundant reason to disapprove of the so-called secondary centres for space, light, and color.

In brief, it can be said of this work, that besides offering itself as a most valuable contribution to the working library of both the scientific neurologist and the medical ophthalmologist, it can be recommended to any experimental physiologist and practical pathologist in this line of research, as well worthy of perusal. C. A. O.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Sperminum (Poehl).

Dr. Bubis has made a very careful chemical, physiological, and therapeutic study of spermin, which according to Schreiner, has the formula C_2H_5N (Ladenburg and Abel, C_2H_4HN). This substance is not, however, any more identical with the Brown-Séquard testicular fluid than morphine is with opium, or atropine with belladonna. Investigation shows that this substance is not any more peculiar to the male (testicles) than to the female sexual organs (ovaries). Further, that it is found in the thyroid gland, pancreas, and spleen. It is quite likely that it is an element which is found in the entire lymphatic system of the body, and it has been found, although not in its purity, in the liver and brain. It has also been shown that this substance has a distinct influence upon the oxidation processes in the body, and that it increases the imperfect oxygenating power of the blood. Also, that when the oxygenating power of the blood is diminished by acids, this diminution is neutralized by spermin. Urinary analysis also shows that the intra-organic oxidation is increased, and also that the combination of leucomaïnes with the xanthine and the creatin-group is favored or that they are oxidized, and in both instances excreted in large amount. This destruction and increased excretion is likely to prevent much auto-intoxication. Laboratory experiments show that the reduction in manifestations which mark the activity of the cholera bacillus are wanting, and this statement is also true for culture of cholera nostras. Physiological experiments show that in mammals there are no symptoms of depression; it also acts as a stimulant in the sexual tract and increases the activity of the spinal cord. Although the drug has an antitetanic action, it cannot be employed as an antidote to strychnine because it can also increase tactile sensibility. In large doses it slows and strengthens the heart, but in most instances it is without influence upon the vascular system. The morphological elements of the blood are unchanged by its sub-

cutaneous injection. Therapeutically, it does not give rise to pain, nor to local reaction, on injection, and it gives a sensation of increase of strength. On the locomotory system it improves the gait, tremors, and rigidity, and other motor disturbances, and causes the pains of ataxia, of the head and loins, to cease. It relieves the attacks of angina pectoris, the cardiac pains and palpitations of neurasthenic girls, and alleviates the pain of sciatica, rheumatic pains in the hands and loins. It improves the visual and auditory capacity, although failures are reported. It may act as a hypnotic in neurasthenia, tabes, anæmia, spinal epilepsy, and hysterical manifestations. Upon muscular strength the dynamomoter shows that it exerts a favorable influence. In tabes dorsalis it regulates bladder disturbances; in diseases of the spinal cord it cures incontinence. On the sexual system it increases its energy, not altogether through a specific action, but from its general tonic effect. It has relieved obstinate constipation due to various causes, as hemiplegia, marasmus senilis, and anæmia. It apparently increases the oxidation of nitrogenous material, and it may lessen the excretion of sugar in diabetes. In senile emphysema, cardiac weakness, it has caused œdema to disappear. Spermin has been employed in various conditions, neurasthenia, tabes dorsalis, cerebral and spinal diseases, syphilis and skin diseases, diabetes mellitus, phthisis and other pulmonary diseases, diseases of the heart, and poisonings, as chloroform. In all cases where a physiological tonic is indicated, and when oxidation processes must be aided, this remedy appears to be of value. It is probable that spermin is not the only ferment in the organism which is a protection against the outbreak of disease. The discovery and the study of these is for the future.—*St. Petersburger medicinische Wochenschrift*, 1894, Nos. 9, S. 73; 10, S. 83; 11, S. 93, and 12, S. 105.

The Diet in Diseases of the Stomach.

Dr. H. Loetscher believes that the treatment of the patient should be based upon the consideration of his general condition and constitution. In the treatment of the disease the individual should not be lost sight of. A meat diet, care being taken in selection and cooking; fish, under the same limitations as to fats as for meat, with eggs next in order, are of great value. Fats are usually injurious because badly borne, giving rise to fermentation, and they are often found in the feces. In inflammatory conditions, atony, and dilatation, green vegetables are contra-indicated; in other conditions if intestinal catarrhs, usually present, are absent, they are not absolutely contra-indicated. An agreeable, easily digested vegetable, which is well borne by most stomachs, is mashed potatoes cooked with milk. The carbohydrates are important, but they need preliminary preparation to free the starch from the cellulose-capsule. So-called prepared foods have the advantage of requiring but ten to fifteen minutes' cooking in lean bouillon or milk in order to make a strong, tasty, and easily digestible soup. Fluids should be taken during the meal in limited quantities, in order not to increase the stomach contents, and not to dilute the gastric fluids. Black tea, taken at an appropriate time, has a soothing, refreshing effect upon the stomach and upon the nervous system if it is properly prepared. The amount should not be too large, nor the steeping last more than three or four minutes, so that too much tannin is

extracted. Of great importance is the greatest possible rest of the organ, not only in assisting the stomach, but as well by bodily rest.—*Correspondenz-blatt für Schweizer Aerzte*, 1894, No. 9, S. 265.

A Contribution to the Study of Piperazine.

Dr. John Gordon finds that the stronger solutions have a greater solvent power over uric acid calculi; but the difference is much less than might have been expected from the relative strength of the solutions. This is a point of clinical importance, since it is proved that the drug is not entirely oxidized in the body, but that a considerable amount is excreted unchanged and in a state to combine with uric acid in excess. Piperazine in strength of from 1 to 7½ per cent., in normal urines at a temperature of 102° F., has the property of dissolving uric acid calculi, and of disintegrating and rendering soft and pulpy the undissolved portion. The solvent action of this drug under similar circumstances is greater than of other substances, as borax, lithium citrate, sodium carbonate, and potassium citrate. Neither of these substances rendered the fragment of calculus soft and pulpy as did the piperazine.—*British Medical Journal*, 1894, No. 1746, p. 1291.

The Therapeutic Action of Malakin.

Dr. Ferdinand Merkel reports eighteen cases upon which he has used this remedy. He has found it, as its name signifies, mild. Unpleasant symptoms, as tinnitus, headache, vertigo, loss of appetite, or delirium, were not noticed. The worst symptom was sweating, but this in many cases was completely absent. Upon the temperature it has an unmistakable influence, reducing it gently, slowly, and restraining it for a period of short duration; a lasting antipyretic effect was not observed in any case. As an anodyne it has rendered good service, although in intensity of therapeutic effect it does not bear comparison with antipyrine or phenacetin. As an anti-rheumatic it ranks with sodium salicylate and similar remedies in producing distinct improvement in swelling and painfulness of joints and muscles, yet in several cases, even in doses of from seventy-five to ninety grains, equally as well as the usual salicylic preparations, it may completely fail. In spite of this it is an agreeable remedy, often acting favorably in articular rheumatism, and, with the exception of sweating, free from any unpleasant symptoms. As an antipyretic and anodyne it acts slowly and mildly; if not with the promptness of other remedies, at least without their unpleasant effects; especially it does not have any injurious effect upon the stomach. Whether it is proper to recommend the drug in larger doses, and more rapidly following each other, as one is accustomed to do with sodium salicylate, is well worth further study. At present, however, it is four times as expensive as sodium salicylate, although it represents but 50 per cent. of salicyl aldehyde, and this gives not much encouragement for increased dosage. The dose varies from fifteen to sixty grains per day, which is best administered in capsules, as it is insoluble in water and with difficulty soluble in cold alcohol.—*Münchener medicinische Wochenschrift*, 1894, No. 17, S. 324.

The Therapeutic Action of Organic Extracts.

Dr. Charles Forbes, after a lengthy chemical trial of organic liquid extracts, has adopted a particular class of preparations of these extracts, viz., "tabloids." He believes that thyroid extract would also be useful in cerebral anæmia from various causes. There is a necessary differentiation of the various properties of these extracts which is yet to be made out, and we are justified, by the marked success gained in certain diseases, in experimenting with each of these extracts in whatsoever complaints we may judge it will afford us any chance of success. With reference to the use of spermin and ovarian extract, it is believed that both the testicle and ovary possess some function apart from the manufacture of semen and ova which has not yet been clearly described by the physiologists. An earnest plea is presented for more clinical observation, which is likely to lead to results highly beneficial to the human race.—*Medical Press and Circular*, 1894, No. 2875, p. 619.

Tetanus Treated by Behring's Serum.

Dr. Hans Doerbler reports a case of typical tetanus of moderate severity. The prognosis upon the eighth day was measurably favorable, yet upon the tenth day twelve drachms of serum was injected, which gave rise to a slight general reaction in the form of an elevation in temperature. Locally and in the general condition the injection appeared to have no dangerous effect. The conclusion very properly is that, on account of the lateness of the administration of the remedy and the favorable prognosis before its administration, no conclusion can be arrived at as to the effect of the remedy.—*Münchener medicinische Wochenschrift*, 1894, No. 15, S. 282.

The Balneo-mechanical Treatment of Diseases of the Heart (Method of the Drs. Schott).

Dr. G. Pagenstecher, from the double standpoint of a cured patient and an interested physician, presents a very careful analysis of this method. This treatment consists of the use of two agents: 1. Baths of sodium chloride of different concentrations. 2. Manual gymnastics (so called) of resistance. Internal medicine is sparingly used, but not altogether prohibited. The treatment is commenced with the baths, while gymnastics are made use of toward the end; the former being the curative agent, the latter to prevent relapses. The concentration of the bath varies from 0.5 to 3 per cent.; the duration from five to eight minutes, which is increased to fifteen or twenty toward the end of treatment. The temperature at the beginning is 95° F., which is gradually reduced to 80° or 82° F. All persons do not, however, bear these concentrated baths of low temperature; the nervous and anæmic patients are especially refractory. At times, when the concentration exceeds 2 per cent., or the temperature is lowered, in order to avoid the nervous excitation and physical depression, free carbon dioxide is added. This is a cutaneous excitant of the first rank, and counteracts the anæmic effect of the cold water, and it permits a still further lowering of the temperature of the bath. The free acid is produced by the action of hydrochloric acid upon sodium bicarbonate in salt water. The remarkable fact connected

with these baths is the lowering of the pulse-rate: at first the tension becomes greater and the breadth is diminished; after five to ten minutes it becomes broader, regular, soft, and finally full. The gymnastic treatment is borrowed from the Swedish school, and consists of: 1, passive movements; 2, active movements, divided into active movements, properly so called, and movements of resistance. The following rules guide the practice of gymnastics: 1. No movement should be executed twice in succession. 2. Each movement should be separated from the next by an interval of rest (ten to fifteen seconds). 3. Movements should be made with great slowness. 4. The patient should breathe in his ordinary rhythm during the execution of the movements. 5. The movement should be immediately suspended when the respiration becomes accelerated or interrupted. 6. The initial resistances should be minimal and increased only in proportion to the strength of the patient—never to fatigue. 7. The *séance* should never exceed thirty minutes, and should be ended as soon as the patient experiences fatigue, suffocation, or vertigo. 8. All muscles of the body should be successively put into action. The general therapeutic results are analogous to those obtained from digitalis, viz.: slowing of the pulse, increase of arterial pressure, regulation of the cardiac movements. Generalized arterial sclerosis and aneurisms are absolute indications to this form of treatment.—*Bulletin général de Thérapeutique*, 1894, 22e livr. p. 503.

The Treatment of Neuralgia with Analgen.

Mr. George Foy has made a clinical study of this substance, which rejoices in the name of ortho-æthoxy-ana-mono-benzoyl-amido-quinoline ($NHOOC_6H_5H$). It is a white crystalline powder, insoluble in water, soluble in acids, readily soluble in hot, and sparingly soluble in cold, alcohol. From experiments upon dogs it has been determined that it is non-toxic, and even when given in large doses the kidneys remain unaffected. The urine may become a cherry-red color, due to the action of the uric acid upon the separated benzoyl group of the analgen, but this is of no physiological or pathological importance. Neither blood, albumin, nor sugar has been found in the urine after its use. It has not given rise to tinnitus, fulness in the head, nausea, nor to a single case of rash. After an experience of two hundred cases, it is believed that the smallest effective dose for adults is ten grains, repeated in three hours; the largest dose was fifteen grains. A shorter interval—two hours—is still better. For rheumatism the effects are more marked if it is combined with sodium tartrate in drachm doses, or if its use is preceded by the old-fashioned black draught and blue pill. As an anti-neuralgic remedy it is a great gain and very welcome to the medical profession.—*Medical Press and Circular*, 1894, No. 2875, p. 620.

The Therapeutic Value of Vagus-compression.

Dr. Dubois quotes Quincke, that slowing of the pulse upon pressure on the carotid is a very constant phenomenon, equally in the healthy as in the sick. This pressure, it is more probable, results in a mechanical irritation of the trunk of the vagus, which lies behind and to the outside of the carotid. A single case is reported, the symptoms being dyspnœa and palpitation, and

paroxysmal tachycardia. These attacks occurred frequently and suddenly, and lasted from five to fifteen hours, and went on to severe collapse. Physical examination revealed nothing beyond an anæmia and a slight bronchial catarrh in a very nervous patient. During an attack the patient was pale, the pulse was above 140; small but regular. Within five seconds under vagus-compression it fell to 128, in five more to 96, and remained for several days at 88. Although but little can be deduced from a single case, this appeared to bear the clearness of a physiological experiment, and to be free from any doubt.—*Correspondenzblatt für Schweizer Aerzte*, 1894, No. 10, S. 297.

The Elimination of Uric Acid by Dry Turpentine Vapor.

Dr. Benoit du Martouret reports two observations which seem to show that the vapor has a distinct effect in increasing the elimination of uric acid, and upon this fact rests the explanation of the relief which arthritic, rheumatic, and gouty subjects experience under this treatment. The vaporizing apparatus maintains a constant and graduated heat, and should be distinguished from those baths which by their excessive heat present great danger of cerebral congestion. It is hoped by this method also to cure the pyelonephritis caused by calculus, and so to reduce its volume that the calculus may be evacuated *per vias naturales*.—*Lyon Médical*, 1894, No. 24, p. 217.

The Treatment of Cystitis.

M. Lavaux believes several remedies to be of real value. Sodium bicarbonate in thirty to ninety grains is the remedy of choice when the inflammation is due to irritation, as from cantharides; it is absolutely contraindicated with ammoniacal urines. Sodium borate has a favorable action according to the doses which are employed; thirty grains seem to act as an alkali. In ninety grain doses it acts as a feeble antiseptic, and is of some value if the cystitis is one of vesical infection, but it is not well borne by some stomachs. Sodium benzoate, benzoic and boric acids are better borne, but appear to be but little more energetic than the last-mentioned remedy. More efficacious is salol, but it is a dangerous remedy, and can cause severe accidents. It should be prescribed in from thirty grains to two drachms, the latter being too great. It must be used in small doses if the patient suffers from renal lesions. The pure essence of yellow sandal is quite active in the cystitis of blennorrhœic origin, but it often is badly eliminated by the kidneys, which it may irritate; it frequently gives rise to renal pain and, indeed, it may aggravate the cystitis. One drachm to one and one-quarter drachms is a safe dose. Turpentine, even in acute conditions, may be of value, ten drops being a sufficient dose. Buchu is better borne by the stomach than tar, eucalyptus, or uva ursi. If mineral waters are used, those of feeble mineralization, as Evaux, are preferred, although in acute cases Vichy or Vals may be valuable. Pain is best relieved by direct anæsthesia of the urethro-vesical mucous membrane. Morphine subcutaneously, opium with belladonna or gelsemine in suppository, chloral by the mouth, may be of value, but they are indiret methods. The direct method by lavage without catheter and anæsthesia of the mucous membrane, by cocaine hydro-

chlorate or nitrate, and antisepsis of the lower urinary tract, are those of choice. The objections to local treatment are obviated when strict antisepsis is obtained, and pain is not caused if the bladder is not distended. A warmed 2 per cent. solution of boric acid is unirritating.—*La Chirurgie contemporaine des Organes Genito-urinaires*, 1894, No. 5. p. 140.

Rectal Injections of Creosote in Phthisis.

Dr. Ch. Eloy presents the various formulas which have been proposed, considering as one of the best that of Tisné and Simon: Pure beechwood creosote 0.40, iodoform 0.005, salol 0.40, dissolved in pure olive oil, 10. The injection is to be made each day through a rectal tube, the patient being in the left lateral decubitus; the solution is to be warm; the injection must be made slowly, and carried as high as is possible. The absorption is rapid. When intestinal symptoms arise this method must be abandoned. No remedy is more difficult to manage than creosote, and the degree of tolerance is variable, even for the same individual.—*Journal des Praticiens*, 1894, No. 49, p. 559.

Thermodine.

Dr. Schmitt describes this substance as occurring in white pointed crystals, without odor and almost tasteless, although upon trituration there is developed a special aromatic odor, and after some seconds, if a fragment is placed upon the tongue, a persistent bitter taste is perceived. It is slightly soluble in cold (1 : 2600), more easily in warm water (1 : 450); but readily in alcohol, ether, benzin, carbon disulphide, and chloroform. While physiological researches have demonstrated the harmlessness of doses, even relatively large, in healthy men, they have also determined its method of elimination. It is absorbed with the aid of the lactic acid of the stomach, is decomposed slowly in the economy into amidophenol, which is eliminated in the urine, probably also in the perspiration and possibly in the saliva. A small proportion, if the dose is large, may be eliminated unchanged. The dose employed at which anti-thermic effects have been manifest is between six and seven grains. On twenty-nine patients, suffering from typhoid fever, influenza, tuberculosis, articular rheumatism, and pneumonia, the effect was found to be a gradual fall of temperature, commencing generally within an hour after its administration; this fall is gradual, reaching its lowest point within about two hours. This point is retained up to the third or fourth hour, when the ascent takes place in the same regular and slow manner as the fall, and the initial degree is reached generally in from seven to nine hours after the administration of the drug. The extent of the fall of temperature depends somewhat upon the dose. Five grains in tuberculosis does not always give appreciable results. Eight grains are usually sufficient; tuberculosis is more easily influenced and with smaller doses than is typhoid fever, and pneumonic fever is less amenable to this drug. The pulse curve follows closely that of the temperature, although the pulse may be influenced later than the temperature as regards the diminution of the number of beats, but it is likely to become accelerated as soon as the temperature commences to rise. Sometimes the pulse-rate remains unchanged although there is a notable lowering of temperature. There have been no accidents in the use of this drug which

are worthy of record; no gastric disturbances, vomiting, cyanosis, nor collapse. Occasionally sweating, and more rarely chilly sensations, have been noted. The drug apparently does not modify the hæmoglobin. The remedy has been generally administered in the morning in a single dose, and the quantity has been from the amount above named up to (rarely) fifteen grains. In conclusion, it can be said that thermodine is an antipyretic without danger, constant in its action, but very slow in producing this effect, and its results are sufficiently prolonged. It presents certain advantages over phenacetine, although it is inferior to it in activity, and it is expensive.—*Les Nouveaux Remèdes*, 1894, No. 9, p. 194.

The Action of Cold upon Chlorotic Women.

Dr. Augusto Murri has found that in chlorotic women the action of a lower external temperature is a disadvantage, while cold douches or seabathing is, in these same women, a valuable remedy. These patients, on the approach of winter, take to their beds and present the classical signs and symptoms of the disease, which the author terms winter chlorosis. These cases also show a tendency to relapse with each approach of the cold season. The beneficial results of cold baths in these cases is explained by the observations of Rovighi and Winternitz, which showed that these increased the number of red-blood globules, and the functional activity in the vasomotor apparatus is increased. This, then, explains the apparently paradoxical statement.—*Internationale klinische Rundschau*, 1894, Nos. 17, S. 593; 21, S. 756.

The Use of Ergotine in Pulmonary Tuberculosis.

Dr. T. Crocq has, in common with many other practitioners, made use of ergotine for the purpose of checking hæmoptysis. At times, believing that hemorrhage was likely to recur, he has used this remedy as a preventive. In such cases he has noticed that the expectoration and feelings of oppression were less and the general condition of the patient showed an improvement which was to be explained by the vaso-constrictor action of the drug, relieving the congested condition of the tissues. It also will check the inflammatory processes and, so long as it is well borne by the stomach, favor nutrition. Bonjean's ergotine is administered in from eight to sixty grains per day, in a mixture, or in pills, one and one-half to three and one-half grains, three or four times daily, or, finally, in subcutaneous injection, from eight to fifteen grains.—*Internationale klinische Rundschau*, 1894, No. 21, S. 745.

An Apparatus for Narcosis.

Dr. Vajna presents a glass apparatus in the form of a truncated cone, the facial extremity broader and furnished with a rubber edge which fits closely upon the face. The distal extremity is covered with flannel, which absorbs and prevents the evaporation of the substance used. It possesses the advantages of easy cleansing, its transparency permits constant inspection of the face, the evaporation of the anæsthetic is prevented, and economy secured; the desired proportion of air and anæsthetic vapor is secured, the anæsthetic cannot burn or otherwise injure the face, and it is applicable to all kinds of anæsthetics.—*Gazette hebdomadaire*, 1894, No. 21, p. 246.

MEDICINE.

UNDER THE CHARGE OF

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A Case of Periodic Paralysis of Family Type.

Hirsch (*Deutsche medicinische Wochenschrift*, 1894, No. 34, p. 646) has reported the case of a man, twenty-six years old, who presented a peculiar form of palsy of transient duration and recurrent type, and whose mother had presented a similar disorder. No other members of the family were known to have suffered in the same way or from any other form of nervous disease. It could not be stated when the attacks began in the mother; at first they occurred once or twice a year, but later they took place rather regularly once in three months. The attacks consisted in the development of complete paralysis of almost all the muscles in the course of five or six hours, lasting on an average for twenty-four hours, and disappearing as suddenly as they set in. Only the facial muscles were said to have escaped. During the attack consciousness was fully preserved, and there was an absence of noteworthy pain, as well as of unpleasant sequelæ; there was, however, marked thirst. The personal history of the son was good and was free from venereal infection, alcoholism, excess in the use of tobacco, and malarial or other form of fever. The first attack occurred at the age of nineteen or twenty, when he noticed that the extremities gradually became heavy and stiff—first the arms and then the legs. The condition became so aggravated that the patient was compelled to go to bed. It disappeared at the end of twenty-four hours. For the succeeding four or five years the attacks were repeated once every year, being preceded for some days by a sense of heaviness and fatigue in the extremities. After the attack the patient felt as well as before, and was able to pursue his ordinary vocation as a waiter. At this time his first attack of distinct and well-marked paralysis occurred; this began, like the others, with a sense of heaviness in the extremities that rapidly progressed to complete paralysis of the muscles of the arms, legs, and trunk, the facial muscles escaping. The complete palsy lasted for twenty-four hours and then disappeared suddenly. During its continuance there were no other disturbances except intense thirst. After the attack the patient felt as if nothing unusual had occurred. For none of the attacks was there an obvious cause. The

patient was not neurotic, but, on the contrary, rather phlegmatic. He came under observation during an attack that occurred two months later. The onset was, as usual, attended with a sense of heaviness in the extremities, but on this occasion first appreciated in the legs, thence ascending. In the course of twelve or fourteen hours the patient was completely paralyzed. Consciousness was not in the least disturbed, and the patient spoke intelligently and without impediment. He complained of no pain, but only of a sense of discomfort from inability to move. The facial movements were all well performed, and the acuity of vision and of hearing was normal. The ocular movements were perfect and the pupils reacted to light. The head was held somewhat stiffly; it could neither be rotated nor flexed and extended. The muscles of the neck were relaxed, and passive movement was easily effected in all directions. The lower portion of the sternum was somewhat retracted; there was little movement of the chest in respiration. Physical examination revealed no lesion of the lungs. The area of cardiac dulness was increased; the first sound of the heart was impure and possibly attended with a murmur; the pulmonary second sound was accentuated. The pulse was regular and of moderate tension. The area of hepatic percussion dulness was somewhat increased; that of the spleen unchanged. The patient lay in the dorsal decubitus, and was unable to rise or to move from side to side. The upper and lower extremities were in a state of atonic paralysis. The idio-muscular irritability of the paralyzed muscles was preserved, though diminished. The various reflexes were absent. All forms of sensibility were unaffected. The functions of bladder and rectum were efficiently performed. The urine displayed no abnormality. There was increased thirst, though no excess of perspiration, and the temperature was normal. The electric reactions could not be studied. The patient slept well during the night, and on the following morning his condition was unchanged. He was given a bath at a temperature of 95° for half an hour. Somewhat later in the day he was able to make some lateral movements of the head. During the following night the patient was suddenly awakened and found that he was able to move all his extremities, and on the next morning he was able to go about as usual. The reflexes had also returned, while the pulmonary second sound of the heart was no longer accentuated and the area of cardiac percussion dulness had receded. The pulmonary excursus had distinctly increased, and the respiratory act was performed perfectly normally. The patient was lost to observation, but it was learned that during the following four months he had none of the severe attacks, although a number of minor attacks of weakness in the arms had occurred, but only after the use of alcoholics or tea.

The Relation of Visceral Disease to Cutaneous Sensory Areas.

Head (*Brain*, 1894, Part III. pp. 339–480) publishes the second part of his admirable and patient researches upon the areas of superficial tenderness associated with visceral disorders. The researches here communicated relate to the sensory and painful areas of the head and neck. These are again compared with the distribution of herpetic eruptions, and referred so far as possible to central nervous segments. The distribution is complicated, and can only be understood by a reference to facts of embryology and ontology.

Between migraine and other headaches, especially the headaches of gastric derangement and of eye-strain, Head establishes important differences:

Migraine.	Referred headache.
1. The pain follows areas differing fundamentally in distribution from those of referred pain.	1. The distribution of the pain follows the lines laid down in Chap. I. (of Head's treatise).
2. The pain is associated with intense deep tenderness.	2. The pain is accompanied by more or less intense superficial tenderness.
3. Movement of the head, or anything that produces it (laughing, going upstairs, etc.) causes an increase of pain.	3. Pressure relieves the pain, and the patient can go upstairs without much increase in the headache.
4. The headache may be preceded by visual phenomena of the highest order, such as scotoma, "fortification figures," etc.	4. The headache is never preceded by these highly developed visual phenomena, but may be accompanied by amblyopia or flashes of colored light.

There are certain parts which do not cause referred pain, because they belong to the surface-lining of the body. Such parts are the conjunctiva, the epithelium on the anterior layer of the cornea, and the external auditory meatus. The external auditory meatus is, on the contrary, a part to which pain may be referred. A second group of structures which tend to cause local and not referred pain, accompanied by local and deep tenderness, is formed by the external lining of the organs of the head. The periodontal membrane and the dura mater are included in this group.

The areas in which referred pain occurs in connection with visceral disease are divided and named by Head according to a scheme described, and are associated with areas of the body divided according to the nomenclature of his previous paper. The original treatise must be consulted for details, but the table following may be copied:

Area on body.	Associated area on scalp.	Organs in particular relation with these areas.
Cervical 3	Fronto-nasal (? rostal)	Apices of lungs, stomach, liver, aortic orifice (?)
" 4	"	
Dorsal 2	Mid-orbital	Lung, heart (ventricles), ascending arch of aorta.
" 3	"	Lung, heart (ventricles) arch of aorta.
" 4	Doubtful	Lung.
" 5	Fronto-temporal	Lung, heart (occasional).
" 6	"	Lower lobe of lungs, heart (auricles).
" 7	Temporal	Bases of lungs, heart (auricles), stomach (cardiac).
" 8	Vertical	Stomach, liver, upper part of small intestine.
" 9	Parietal	Stomach (pyloric end), upper part of small intestine.
" 10	Occipital	Liver, intestine, ovaries, testes.
" 11	"	Intestine, Fallopian tubes, uterus, bladder (contraction).
" 12	"	Intestine (colon), uterus, etc.

A "Bruit de Diable" in the Abdominal Vena Cava.

Verstraeten (*Centralblatt für innere Medicin*, 1894, No. 32, p. 737) points out that in certain cases of anemia a well-defined venous hum is to be heard in the epigastrium in an area of from 1 to 2 sq. cm., just below the margin of the liver from ½ to 1 cm. to the right of the median line. The sound is a continuous blowing one of varying intensity, sometimes musical and wavy and materially influenced by the respiratory and cardiac movements. It has not been found in very young anæmic children nor in the emaciated beyond sixty years of age. It is best developed in nervous, anæmic, emaciated adults, especially women, and in the course of chronic disease of the stomach, dyspepsias, diarrhœas, and pulmonary tuberculosis. It has not been found in cases of cirrhosis of the liver. The stethoscope is necessary to elicit the phenomenon, and this is facilitated by gentle pressure. Like the venous hum in the neck, the sound is very variable; it is inconstant, and disappears and reappears without obvious cause. When present it can be suppressed by compression of the vena cava at the umbilicus. The abdominal bruit is often associated with a hum in the neck; but there is no constant relation between the two, either in intensity or coincidence. Its production and its intensity seem to be favored by excitement, inducing increased cardiac and circulatory activity. The sound may be heard both in the sitting and the semi-recumbent posture, as well as the horizontal position. It is almost always continuous and attended with systolic, or, more accurately, presystolic accentuations, occurring synchronously not with the ventricular systole but with the aricular diastole. The sound is influenced by the respiratory act, being intensified shortly after inspiration. Compression of the ascending vena cava to a degree that does not suppress the murmur causes a heightening of the pitch, the exacerbations only persisting as a whistling intermittent murmur. Tactile fremitus was not observed in connection with the abdominal "bruit de diable."

Fatal Hemorrhage from an Aneurism of the Hepatic Artery in a Case of Gall-stones.

M. B. Schmidt (*Deutsches Archiv für klin. Med.*, Band lii., Heft 5 u. 6, p. 536) reports the results of post-mortem examination in a case of A. Cahn's. The patient was a woman, aged forty years, who had for some time suffered with symptoms of gall-stones. Five weeks before death there was a moderate hemorrhage from the bowel with slight hemoptysis; a few days later more profuse bleeding, and the development of slight icterus. Bright-red blood was passed with stool, and three weeks before death another profuse hemorrhage was noted. A fourth severe hemorrhage was quickly followed by death. The intestinal canal was filled with fluid and clotted blood. No change in the mucous membrane was found from jejunum to rectum. Extensive peritoneal adhesions involved the duodenum, colon and gall-bladder. In the new tissue small abscesses were found, which did not, however, open into the gall-bladder. The blood appeared to have entered the intestine through three large perforations involving the attached portions of duodenum and gall-bladder. The largest, 1.5 cm. in diameter, began 2 cm. below

the pylorus; the second, irregular in shape, was 1.5 cm. lower; the third and smallest, about the same distance below the second; the first penetrated the apex, the last involved the base of the gall-bladder. Upon each of the three openings lay a gall-stone, and from the neighborhood of the stones upon light pressure blood flowed into the intestine from the gall-bladder, as likewise from the ductus choledochus, through the papilla, which lay about 2 cm. below the third perforation. Near the three stones a blood-filled ovoid sac, about 6 cm. long and 3 cm. in greatest diameter, overlay the gall-bladder, into which it opened by a perforation near the apex, in relation with an abnormal communication between the gall-bladder and the hepatic duct near the division of the latter; and here the lumen of the sac was continuous with that of a ring-shaped body, which blocked and dilated the hepatic duct, and overlay the abnormal opening described. At this place a circular opening 3 to 4 cm. in diameter was covered by a valve-like projection or ruffling of the mucous membrane; and this opening led directly into the right branch of the hepatic artery.

In the neighborhood of the projecting valve the lining membrane of the duct was roughened, and showed a number of small superficial ulcers. About 1 cm. nearer the duodenum two larger ulcers were found. The hepatic duct was much distended near the site of the perforation, but narrowed further on, and again widened, together with the common duct, near the duodenum. Above the aneurism the bile-ducts were but slightly dilated. The lumen of the hepatic artery was free from obstruction; the edges of the opening were smooth, while the arterial wall projected as the inner lining of the circular ruffle-like valve in the lumen of the hepatic duct. There was no arteriosclerosis. Microscopic examination showed nothing of arterial wall or other organized tissue either in the basal ring-shaped portion of the false aneurism or in the ovoid sac.

Schmidt finds records of but five cases of hepatic aneurism in which rupture and hemorrhage took place through the bile-ducts.

SURGERY.

UNDER THE CHARGE OF

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ILEO-COLOSTOMY.

AN interesting case of ileo-colostomy by means of Senn's method of lateral anastomosis modified by the use of prepared vegetable plates, is reported by v. BARACZ (*Centralbl. für Chir.*, July 7, 1894). The resected

portion, consisting of the cæcum and portions of the colon and ileum, was not removed, on account of adhesions and malignant involvement, but the ends were sutured, and it was left within the abdominal cavity without any external outlet. The author draws the following conclusions from the case: 1. In man the resected and closed portion of gut left within the abdomen produces very little or no excretion. 2. Therefore this method of procedure is not so harmful as has sometimes been supposed, and the bursting of the intestine from the collection of intestinal excreta is not to be feared. 3. This method is especially applicable to cases of intestinal obstruction due to invagination or malignant disease. He considers the method more rational than simple anastomosis, as it prevents the irritation of the diseased part by the passage of the intestinal contents over it. 4. Senn's method, modified by using prepared vegetable plates, is preferable, the prepared turnip plates never producing necrosis and perforation, as has occurred with bone plate not sufficiently decalcified.

The Operative Treatment of Ruptured Urethra.

Deanesly (*The Practitioner*, July, 1894) points out the fact that rupture of the urethra occurs almost always in one of two situations: either in the immediate neighborhood of the bulb or in the membranous portion. If divided in front of the triangular ligament the classical symptoms follow. "When, however, the urethra is ruptured behind the triangular ligament in cases of fractured pelvis, extravasation occurs in the prevesical space between the bladder and the pubis, where a considerable quantity of urine may collect. This fact sometimes leads to a fallacy. A catheter is passed, following the roof of the urethra, and keeping the point strictly in the middle line. On depressing the handle between the legs the catheter enters a space in which it is freely movable from side to side, and from which five or six ounces of clear urine may be withdrawn. By the rectum the catheter feels exactly as if in the bladder, although it is in reality in the prevesical space." In regard to treatment the author believes that in all cases of rupture of the bulbous portion of the urethra, and also where a blow upon the perineum has produced free bleeding from the urethra, the latter should be exposed and examined, whether a catheter can be introduced or not. The catheter may prevent extravasation, but in no way prevents the formation of a most intractable stricture. If the urethra has been completely divided, the ends should be carefully and accurately sutured. The bruised or lacerated portion should be resected. The author advises the use of a non-absorbable suture—silkworm gut, horse-hair, or fine silver wire, the sutures to be removed later, the ends being left long for this purpose and brought out of the wound, or the wound may be left open. He does not use absorbable sutures on account of the liability to contamination of the wound by urine, which prevents their enclosure or absorption. The sutures should include the whole thickness of the urethra except the mucous membrane, and care should be taken not to fold the edges of this into the wound. Four sutures are usually enough. The perineal wound may be accurately sutured, the stitches including the bulbo-cavernosus muscle, or it may be left open. In cases where the rupture is only partial, the fibrous sheath remaining intact, the author would advise

a longitudinal incision, exploration, and a resection if much tissue is destroyed. Portions not exceeding one-half to three-quarters of an inch in length may be resected, the urethra being dissected sufficiently free from the corpora cavernosa to admit of approximation. In all cases a catheter should be passed into the bladder and tied in. He advises a soft India-rubber catheter, size No. 8 or 9 English.

Two Cases of Cerebral Injury.

Herehold (*Deutsche med. Wochenschr*, 1894, No. 24) reports two interesting cases of cerebral injury. In the first case the patient, who was twenty-four years old, received a blow upon the head causing a compound fracture; no fragments were felt. Weakness of the left leg and arm came on thirty-six hours after the accident, thus precluding an immediate trephining. The paralysis, however did not disappear, and recurring spasms indicated a further involvement, and operation was determined upon. Instead of coagula, four splinters of bone were found with suppuration of the underlying portion of the brain, which was the superior frontal convolution at a considerable distance from the fissure of Rolando. The author explains the causation of the clinical symptoms by an infected meningo-encephalitis of the superior frontal convolution, caused by the bone fragments and producing an inflammatory œdema of the anterior central convolution. This he justifies by the fact that after the removal of the bone-fragments and the relief of the intra-cranial pressure the cramp and spasms were lessened in intensity. The paralysis in the leg lasted longer, showing that there was probably a circumscribed local area of meningo-encephalitis in that region. The presence of symptoms showing involvement of the sensory system emphasizes the presence of a centre of muscular sense in conjunction with the motor sense in the motor area.

The second case was a compound comminuted fracture with marked depression of the fragments. The fracture extended to the fissure of Rolando and the motor area in the region of the arm and leg centres. The leg recovered rapidly after operation, but the arm recovered more slowly, showing that there had been not only a compression but also a contusion of the brain. Trephining was immediately resorted to, and the patient recovered. The symptoms connected with the sensations of temperature and muscular sense shows that, as has been stated, the location of the muscular sense is in the same region as that of motion.

Tumors of the Maxilla of Paradental Origin.

Nové-Josserand and Bérard (*Rev. de Chir.*, June, 1894), report an interesting case of a solid tumor of the left lower maxilla occurring in a woman, twenty-nine years of age, and in which their investigations led them to the diagnosis of an adamantine epithelioma. They also quote three other similar cases in which they find an identical clinical history, and which, after microscopical examination, seem to be similar in structure, and form together a distinct class constituting benign, solid tumors of paradental origin. The clinical picture shows a slow development, intra-osseous in origin, with a

tendency to break out on to the surface of the bone, the point of predilection being the angle of the jaw. Painful symptoms are absent; there is anæsthesia of the nerves in the locality. Although the differential diagnosis is easily made between malignant and benign tumors, it is not so easy between the solid tumors and the paradental cysts, except when fluctuation is definitely made out, or where an exploratory puncture discloses fluid. This diagnosis has, however, little bearing upon the operative procedure in the case. The case is different when the operator comes upon a solid tumor which is hard to distinguish from malignant disease; if benign it requires only curetting, while more radical measures are needed for malignant disease. The clinical characteristics of the adamantine epithelioma are here of great value; it is more friable than a sarcoma; it does not involve the bony capsule, but is sharply limited by it, and there is to be found within the cavity a tooth more or less developed, which, however, it may require diligent search to find, but its presence clears the diagnosis and determines the operative procedure. The prognosis in these tumors is favorable, but perhaps not so favorable as in the case of cysts, and further study may make more radical measures of treatment necessary.

The Neuralgic Osteitis of Gosselin.

Bloch (*Rev. de Chir.*, July, 1894) from his observations of four cases upon which he operated—in one of which he found, on introducing into agar-gelatin osseous tissue which presented only a hyperæmic appearance, culture forms of staphylococcus pyogenes aureus, and albus in another—concludes that "the disease described by Gosselin under the name of osteitis of neuralgic form, has the same source as bone-abscess, is found in the same situations in individuals of the same age, and presents the same bacteriological forms. It follows that it is dependent directly on an infectious osteomyelitis the same as bone-abscess." Although the two diseases are comparable, there is sufficient difference outside of their anatomical and physiological similarities in the course of the disease to make it possible to distinguish between them, and even to recognize in them two other classes, the subacute and the chronic, which this author believes are less malignant. The proof of this must be found in a case where the patient has the disease in one of the long bones and at such an age that the disease is near to the junction of the epiphysis and diaphysis whose cartilage has not lost its physiological activity; where the disease is of the subacute type, where at the operation no suppuration is found, but alterations pathological and appropriate to a neuralgic osteitis, and finally, where the presence of osteomyelitic microbes can be proven. Such a case came under the author's observation; it was an osteitis of the great trochanter of five weeks' duration, and in a patient fourteen years of age. This case, with the others, demonstrates, the author believes, his view that Gosselin's neuralgic osteitis is a true infectious osteomyelitis.

Contribution to Surgery for the Relief of Gall-stones.

Kehr, writing on the surgical treatment of gall-stones (*Deutsche Zeitschrift für Chirurgie*, 1894, Bd. xxxviii., Hefte 4 u. 5), refers to fifty-three cases, upon

whom he has performed eighty-one operations in the last three and one-half years. Of thirty-six patients upon whom he performed cholecystotomy for stone in one or two stages, there were no deaths. The production of a gall-bladder fistula is not a dangerous operation. In all of the cases a cure has resulted. In a single instance only a fistula remained, but this caused so little inconvenience that the patient did not care to have it closed.

As a result of his observations and experience the author has arrived at the following conclusions:

1. There are entirely too few operations for gall-stones; it is of the greatest importance that these operations should be done early.

2. Many patients with gall-stones do not belong at Carlsbad, but at a surgical clinic.

3. The public must be informed of the dangers attending the presence of gall-stones; the physician must not delay too long the necessary operation.

4. The course of the disease and the intensity of the pain often make operation imperative.

5. Operation may be very necessary, although there be no icterus, swelling of the liver, or tumor of the gall-bladder; also, the pains need not necessarily be typical gall-stone colic.

6. In long-standing stomach troubles, such as dilatation, and especially in so-called stomach cramps, one must not lose sight of the possibility of gall-stones and of the existence of hernia in the linea alba. Many patients are treated for stomach tumors who have gall-stones.

7. Riedel's tongue-shaped appendix is present in many cases of hydrops of the gall-bladder; it is not seldom mistaken for wandering kidney on the right side.

8. Gall-stone colic is frequently due to inflammation of the gall-bladder; the icterus that is combined with it is due to the swelling of the mucous membrane of the bile-ducts.

9. Adhesions, especially between the gall-bladder and the pyloric end of the stomach, cause colic-like pains, although the stones originally causing the trouble had passed a long time before.

10. For removing stones from the gall-bladder cholecystotomy is sufficient; if the proper technique is employed fistulæ will not remain.

11. Adhesions must be freed as far as possible.

12. The ideal method with its modifications is to be discarded.

13. The total extirpation of the gall-bladder is to be considered only on account of disease of its walls (carcinoma, ulcerations, etc.), and not on account of the stones that may be contained in it; in some instances in which the organ is small and shrunken, Riedel's or Lauenstein's method may be employed, and then cystectomy is indicated.

14. Stones in the common duct are to be removed by incision of the duct.

15. Cystic stones must, under certain conditions, be removed by incision of the gall-bladder.

16. The surgical attack is often less dangerous than the treatment by medicine—that is, the waiting and delay of operation.

17. I have not yet observed a recurrence.

18. Gall-stone operations must be executed in clinical institutions only.

19. Only those who are experienced in abdominal surgery should undertake gall-stone operations.

Further Communication on the Treatment of Surgical Tuberculosis by Passive Hyperæmia.

Bier communicated to the "Twenty-third Congress der Deutschen Gesellschaft für Chirurgie zu Berlin" his latest observations on the treatment of surgical tuberculosis by passive hyperæmia (*Archiv für klin. Chirurgie*, 1894, Bd. xlviii., Heft 2). The observations now include one hundred and eighty tuberculous lesions occurring on one hundred and fifty-five individuals. In a case of sarcoma in the neighborhood of the knee, which was at first supposed to be tubercular osteitis, the tumor increased rapidly in size under this treatment. A case of lupus on the arm and leg of a child, supposed to be of tuberculous origin, became aggravated under the influence of passive hyperæmia. The administration of potassium iodide caused rapid healing of the lesions, which led to the diagnosis of specific lupus. This is confirmatory of former observations, that syphilitic lesions are made worse by passive hyperæmia.

Increased tendon reflexes decrease or disappear under passive hyperæmia. To this effect Bier ascribes the rapid improvement of contractions and the increased movability in inflamed joints after this treatment. Inflammations dependent upon staphylococci and streptococcus are unfavorably influenced by the artificial hyperæmia.

The result of this treatment on tuberculous joints is much more favorable if sinuses have not formed than if they already exist. Bier has observed in the former cases relief of pain, return of motion and function, and the granulations cicatrize. The effect on lesions which are discharging freely is, first, to increase the discharge, and, later, to cause its disappearance. Some of the cases are cured, and others result in cold abscesses, which are to be treated in the usual manner.

The treatment of tuberculosis of the bones does not differ from that applicable to joints. All of the cases treated had sinuses. In some the sinuses healed, but if they persisted even after the injection of Villate's solution, operation is proceeded with much sooner than in the cases affecting joints, as in the former the function of the member is not thereby interfered with, as is the case after excision of a joint. In tuberculous disease of the metacarpus and metatarsus, the author reports unsatisfactory results; in all other cases favorable results.

In tuberculosis of the sheaths of tendons, the behavior to passive hyperæmia is about the same as in the cases of joint disease. Some of the cases are cured, and others result in the formation of cold abscesses.

Five cases of tuberculosis of the testicle were treated by Bier's method. One case died of general tuberculosis and the others were much benefited.

Experiments were made on tuberculosis of the glands, without any practical result, owing to the difficulty of applying this treatment to the usual location of the glands.

In tuberculosis of the skin the results have been the most unfavorable.

In conclusion, Bier states that his method is not intended to displace recognized conservative methods of treatment, nor will it do away with excisions and amputations; but, in his opinion, it is one of the best of the conservative measures so far employed.

The Use of Celluloid Plates in Replacing Bone-Defects.

Von Frey (*Wiener klin. Wochenschr.*, 1894, No. 3) in an interesting article describes in detail successful cases of the use of this material as a substitute for bone. After trephining and in injuries of the head he advises the use of a plate the shape of the defect in general, but overlapping it by about three-eighths of an inch on all sides; this should be placed subperiosteally over the defect, the periosteum being raised for about three-eighths of an inch about the margin of the bone-defect. The healing is without reaction, the plate is not absorbed, but its margin is covered over by a growth of new bone or callus, and there is no union with the covering of the brain, no protuberant callus, and, consequently, no irritation of the brain. He also reports its successful use in other regions, supplying the place of the superior maxillary, the floor of the orbital cavity, and the tracheal rings.

Strangulation of Meckel's Diverticulum caused by Volvulus of the Ileum.

Elliot reports the following case (*Boston Medical and Surgical Journal*, vol. cxxx., No. 24), which is of particular interest on account of the question of diagnosis.

A man, aged thirty, was brought to the hospital after an illness of four days, during which time he complained of vomiting, chills, and abdominal pain. On admission to the hospital the temperature was 103.6°, the pulse 160, and the respiration 35. The abdomen was distended, tympanitic, and very tender, particularly to the right of and below the umbilicus. Under ether a large hard mass could be felt in this situation. The bowels had moved twice in the last forty-eight hours.

The case was thought to be one of appendicitis, and an incision was made vertically two inches inside of the anterior superior iliac spine. The appendix was found, however, to be entirely normal. Further examination disclosed toward the middle of the abdomen what appeared like a dilated and gangrenous hernia, but there was no mesentery present. It sprang from the lower part of the convex surface of the ileum, where it was tightly twisted, and extended upward through a dense mass of adhesions to the under surface of the umbilicus. It was then evident that the condition was a strangulated Meckel's diverticulum. It measured seven inches in length, and was of about the same calibre as the ileum. The diverticulum was removed, and the opening in the ileum closed with Lembert's sutures. The ileum was found twisted on itself at this point, partially obstructing the gut, and was held in this position by adhesions. The volvulus seemed to have been caused by the contraction of the mesentery due to an old adhesion.

The patient, already septic at the time of operation, died on the second day of septic peritonitis. The author states that the operation was the most difficult and perplexing one he had ever seen.

The case is important, first, because it impresses the fact that strangulation of Meckel's diverticulum is an occasional cause of acute peritonitis, and, second, because the diverticulum somewhat resembles the vermiform appendix, the former in some cases even having a mesentery. The symptoms of

affections of the two structures would be much the same. The presence of a tumor, and marked tenderness near the umbilicus, and the history of a discharge from the umbilicus, are both significant of the presence of the diverticulum. In either affection there is apt to be a history of previous attacks of pain.

The only treatment to be thought of for the condition under discussion is prompt laparotomy and removal of the inflamed or strangulated diverticulum. The special points to be observed are the careful stitching of the pedicle, as it often opens directly into the intestinal canal, and the careful ligature of the vessels, because the diverticulum is supplied by a branch of the mesenteric artery, which is the persistent omphalo-mesenteric artery, and may be of considerable size.

The Tonsils as a Means of Entrance for Pyogenic Micro-organisms.

Buschke calls attention (*Deutsche Zeitschr. für Chirurgie*, 1894, Bd. xxxviii., Hefte 4 u. 5) to the fact that although suppurative processes have received considerable attention, and in many cases are well understood, still the point of entrance of the micro-organisms is in many cases uncertain. It is well known, for example, that following typhoid fever or pneumonia an osteomyelitis may result, the source of the disease being the typhoid bacillus or the pneumococcus. The bacterium coli commune is also capable, in diseased conditions of the intestinal walls, of escaping and causing suppurative processes. Thus it is possible for germs to enter the blood through the respiratory and alimentary tracts. Garré first pointed out that infection could occur through the skin and the adjacent mucous membranes. It is now conceded that micro-organisms are able to find lodgment in the skin, but a local inflammation is necessary before they can effect an entrance into the blood, which occurs through the medium of the lymphatics. The probability of connection between inflammatory affections of the tonsils and diseases of the deep-lying organs has been referred to by former authors. Ribbert concludes from his investigations that the mucous membrane of the mouth is an effective barrier to the entrance of micro-organisms, except where the epithelium is not *intact*, as the tonsil. Witzel advances the opinion that in acute rheumatism of the joints the tonsils may be the point of entrance of the disease. Kraske and Jordan have likewise attributed osteomyelitis to infection through the tonsils in certain cases.

The author describes several cases in which he attempts to show the connection between diseased tonsils and suppurative processes in the body. Bacteriological examinations showed the presence of streptococci and staphylococci in the crypts of the tonsils and in the blood, as well as in the suppurating focus.

On this ground Buschke expresses the following opinions:

1. That the tonsils may be the points of entrance for pyogenic micro-organisms; it is not necessary that ulceration or diphtheria should prepare the way for lodgment and multiplication of germs.

2. On the basis of experimental investigations it is probable that the tonsils play an important rôle as the means of entrance for pus-producing micro-

organisms, and certainly a more important one than the respiratory and alimentary tracts. Very probably the bacteria do not pass the tonsils without causing slight trouble, which in the majority of cases is unnoticed. The care of the mouth and throat is not only of local hygenic importance, but is also of value for the prevention of general disease.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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SCOPOLAMINE: A NEW MYDRIATIC.

RAEHLMANN (*Klinische Monatsblätter für Augenheilkunde*, xxxi., No. 2) called the attention of the profession to the alkaloid scopolamine, obtained from the roots of the *Scopolia Atropoides* and isomeric with atropine, hyoscine, duboisine, and daturine. He claimed that it excelled any of these as a mydriatic and antiphlogistic; and that, while so strong in its mydriatic action, it had no untoward effects, causing no constitutional symptoms. He employed it as a mydriatic in a solution of one-fifth to one-tenth per cent., one grain or one-half grain to the fluidounce.

Since his publication it has been tested quite extensively by ophthalmic surgeons, a number of whom have published reports upon its action. In general, these agree that it has such mydriatic power as was originally claimed for it; but they fail to sustain the view that it was more free than other mydriatics from liability to produce constitutional effects. And while Professor Kobert, from some experiments on the lower animals, concluded that its general action on the nerve centres was the opposite of that of atropine, the symptoms observed after its use as a mydriatic all seem to indicate that its action on the nervous system is closely allied or identical with that of the previously known drugs of its class.

The present literature and experience regarding scopolamine, therefore, indicate that it is very closely allied to these drugs—if, indeed, it be not the same drug obtained from a new source.

HEMORRHAGIC IRITIS.

HEMORRHAGE in the course of iritis is not a very rare complication. M. TEILLAIS (*La Semaine Médicale*, Année xiv., No. 27) reports an experience with it including five cases. The first occurred in a patient the subject of

chronic alcoholism with vesical disease. In the second the iritis had occured in connection with frontal herpes zoster in a patient free from history of rheumatism or syphilis. The third was the case of a woman in whom serous iritis occurred at the menopause. In the fourth patient, both alcoholic and syphilitic, three successive hemorrhages occurred in the course of the iritis; and the fifth case occurred in a subject of hæmophilia.

He concludes that hemorrhage into the anterior chamber complicating iritis is found at all ages and with the most varied constitutional conditions; and that it neither changes the character of the attack nor seriously retards the cure of inflammation. It should be considered as rather a benign complication, and there is no reason to give it an especial individuality to establish a separate distinct variety of hemorrhagic iritis.

Melanotic Sarcoma of the Eyelid.

Zimmerman (*Ophth. Rev.*, vol. xiii., No. 152) reports a case and collects five others. He finds the diagnosis is not easy, but rapidity of growth and the peculiar dark color, with no hemorrhage to account for it, are the main points; only microscopic examination will finally decide. The treatment is that of sarcoma elsewhere—early and complete excision. Operation in this locality presents no peculiar difficulty, and can usually be made thorough. The destruction of suspicious tissue by the cautery he believes to be important. Primary or secondary plastic operations will usually be required, either for cosmetic reasons or to preserve the integrity of the cornea.

Operation to Correct Astigmatism.

The occurrence of a definite form of regular astigmatism, after operations involving an incision of sufficient length in the cornea, has been recognized since the time of Donders, and the possibility of utilizing the fact for the correction of congenital astigmatism has been considered.

Recently (*Archives of Ophthalmology*, xxiii., No. 1) Bates has suggested incisions of the cornea perpendicular to the most convex meridian, and claims that the amount of correction can be regulated by the number, depth, and location of the incisions; that the operation promises a permanent effect, and the danger to the eye is not so great as the danger from an iridectomy.

He reports two cases in which the operation was performed tentatively, and in one of which the patient's vision, without glasses, was improved.

Insanity following a Mydriatic.

The acute mental disturbance sometimes seen after the use of mydriatics in ordinary refraction work hints the possibility of precipitating serious mental disease by the same means.

Dr. L. H. Taylor (*Annals of Ophth. and Otol.*, vol. iii., No. 3) reports a case in which this seems to have occurred. The strength of the solution of atropine used was 1:120, a drop of which was instilled in each eye three times daily. On the second day the patient became incoherent and excited, but subsequently the trouble took the form of melancholia. It is not im-

probable, however, that the occurrence of insanity was simply a coincidence, since the patient had been subject to great strain in nursing her mother who for some years had been insane, and at the same time doing work far beyond her strength.

Ocular Antisepsis.

Dr. A. Trouseau (*La Presse Médicale*, Année ii., No. 19) reports an investigation made in twelve cases of cataract extraction in which the operation was performed immediately after thorough cleansing of the eye, in five cases with a solution of sublimate 1 : 2000, in five cases with a solution of cyanide of mercury 1 : 1500, and in two cases with distilled water. The results obtained in the way of healing were, with the sublimate, four perfect cures, one cure with some conjunctival catarrh and prolapse of the iris; with the cyanide two perfect cures, two with slight iritis and chemosis, one with more severe iritis and prolapse of the iris; with the distilled water the healing of one was perfect, and in the other there was only slight redness of the eye. Immediately after the sterilization in each case the conjunctiva was wiped with carefully sterilized cotton and the material obtained examined by bacteriological methods with the following results: Streptococci were found in both cases after the use of distilled water, in three of the cases after cyanide, and in two after the sublimate. White staphylococci were found in four cases after the cyanide, and in two cases after the sublimate.

He concludes that on the whole the sublimate solution is superior, being a better bactericide and less irritant than the solution of cyanide of mercury.

Etiology and Treatment of Trachoma.

Dr. F. Pignatari (*Ophth. Review*, vol. xiii., No. 152) finds that in his daily practice (in Naples) eighty-five per cent. of cases of trachoma occur in what may be called lymphatic individuals. The gravest cases are almost invariably found in scrofulous and tuberculous subjects. This, he thinks, points to the dependence of trachoma on the lymphatic tendency. He has noted that the presence of diffused granulation is less common among those living in Paris than among the inhabitants of Naples and London. In the former city the majority of cases are of simple or mixed trachoma. This, he thinks, is due to the fact that in Paris even the poorer classes occupy upper stories of houses built in comparatively broad and airy streets, while in Naples and London ventilation and light are conspicuous by their absence. Among the members of one family those most seriously affected are those who live a greater part of their lives indoors.

A rational therapeutic system requires antiseptic local cure and internal treatment directed toward increasing the organic resistance of the tissue to the inroads of the disease. He advises for a local treatment applications of silver nitrate and other antiseptics, with pressure combined with scarification for the deeper infiltration.

Treatment of Detached Retina.

At the recent meeting of the American Ophthalmological Society, Dr. C. S. Bull (*New York Med. Journ.*) reported his experience with thirty-eight

cases of this condition. He finds "the science and practice of ophthalmology have as yet discovered no better means for dealing with detachment of the retina than the old methods which have been advised and carried out for so many years, viz., rest on the back in bed, atropine, a bandage, and the internal administration of some drug which may induce absorption of the subretinal fluid.

The continued use of pilocarpine, either hypodermatically or by the mouth, may cause great prostration even in cases in which it is apparently well borne; and the desired effect may sometimes be produced by small doses of bicarbonate of sodium and iodide of potassium largely diluted with water."

In recent cases subconjunctival puncture of the sclera may do good, but the improvement is generally transient. Division of fixed membranous opacities in the vitreous causes but little reaction, and may do positive good, as it reduces the danger of extension of the detachment. Vascular opacities should not be disturbed. Division of the detached retina may be done in a quiet eye, and causes little or no reaction.

The Relation of Errors of Refraction to Epilepsy.

H. Work Dodd (*Brain*, part lxiv.) gives a tabulated report of 100 consecutive cases of epilepsy in which the state of the refraction was determined. And of 75 who were considered to need lenses, 52 carried out the treatment by wearing them. Of these, 13 had no recurrence of fits during periods varying from four months to one year, 3 remained unchanged, and 36 were improved. He notes that in only 23 cases was there any family history of fits, and that in 65 there was frontal headache of marked severity. The most notable error of refraction was astigmatism, which was present (over 0.25 D.) in 42 cases, as against 16 per cent. in normal eyes.

He concludes: Errors of refraction may excite epilepsy. The correction of the errors of refraction will, in combination with other treatment, in many cases cure or relieve the epileptic condition. In some cases, when the refraction error has been corrected the epilepsy will continue, generally in a modified form, in consequence of other irritation, even though the error of refraction may have been the exciting cause of the fits in the first instance. In every case of epilepsy, in addition to general treatment and the investigation of other organs, the eyes should be carefully examined under a mydriatic, with a view to correcting by proper spectacles any error of refraction that may exist.

Gouty Retinitis, Chorio-retinitis, and Neuro-retinitis.

C. S. Bull (*Transactions of the American Ophthalmological Society*, vol. vi. part iii.) reports cases with autopsies, and from his own observations and a survey of the literature of the subject, concludes:

In these diseases the changes in the fundus are always bilateral, though rarely symmetrical, in the two eyes. The degeneration in the walls of the blood-vessels and in the retina cause marked impairment of central vision, but little or no impairment of peripheral vision, and never end in blindness. The loss of central vision is always progressive up to a certain point, unless the cause

of the disease is recognized early and the case properly handled. Improvement of vision after the disease is established cannot be expected. Hemorrhages into the retina are rare, except in the beginning of the disease. Their absence later is probably due to the fact that the strength of the vascular wall is increased by the deposit, though its elasticity is diminished.

The most marked feature in the fundus is the development of the arterio-sclerosis and phlebo-sclerosis. This is seen by the ophthalmoscope in the vessels of the retina, and the microscope shows that the degeneration exists as well in the vessels of the choroid and optic nerve. Another most equally pathognomonic symptom is the peculiar yellowish granular exudation in the retina, located by the ophthalmoscope around the posterior pole of the eye, and generally leaving the macula intact, and proved by the microscope to be mainly in the nerve-fibre layer, though found in all the layers except that of the rods and cones. The changes in the optic-nerve fibres seem to be almost entirely intra-ocular, and cannot be traced for any great distance back of the eyeball.

An extended discussion which followed the reading of Dr. Bull's paper showed that the conditions described were not rare, but it was not clear to many of the members that they should be regarded as gouty; the condition most constantly coincident with such ocular changes being one of general vascular degeneration.

The Subjective Test for Astigmatism.

F. C. Hotz (*Annals of Ophthalmology and Otology*) utilizes the distortion of a point of light as seen in an eye that has regular astigmatism. A metal plate is placed before a window or gaslight. In the centre of the plate is a second plate, circular, capable of revolution around its centre, with two apertures, and an index which sweeps over a graduated arc of the fixed plate. The patient, on looking at the point of light, if astigmatic, sees each point as a line, these lines both having a certain direction. The plate is then revolved until the direction of the radius in which the apertures are situated and the index of the movable plate coincide with the direction of the lines, when the two lines will appear as parts of the same line. The index then shows one of the principal meridians of the astigmatism.

Generally the presence and direction of the astigmatism can be detected without the use of any lens, although they will be rendered most evident by placing before the eye a proper spherical lens.

Hotz finds that with such an instrument he has been able to detect the astigmatism in more than 92 per cent. of all cases, and even when the astigmatism was but 0.25 D., it was detected in nearly 85 per cent. of the cases. It requires but a moderate degree of visual acuteness and intelligence on the part of the patient to make it applicable, and he finds no reason to abandon this simple and more reliable instrument for the costly ophthalmometer.

OBSTETRICS.

UNDER THE CHARGE OF

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A CASE OF AIR-EMBOLUS IN PLACENTA PRÆVIA.

HEUCK (*Zeitschrift für Geburtshülfe und Gynäkologie*, Bd. xxviii., H. 1) describes a case of air-embolus with fatal termination in a case of placenta prævia. The patient was admitted in labor, and the diagnosis of placenta prævia established. Under narcosis version was attempted, and a foot seized and brought down to the vulva. As soon as this occurred the woman had a violent pain and bore down hard; at the same time a thick stream of bloody water spurted from the vagina. She was brought lengthwise to the bed, when suddenly the pulse became imperceptible and the face slightly cyanotic. Breathing persisted, but less frequently than normal. Injections of camphorated ether were given, the chin depressed, and artificial respiration practised, but all in vain. The respiration became less and less frequent, marked cyanosis ensued, and death followed in about five minutes. At the autopsy, two hours post-mortem, on section of the right jugular vein, an air-bubble as large as a hazel-nut escaped. The great vessels of the heart were tied. The heart gave a tympanitic note, and on lifting it up one could see clearly through the thin walls of the right ventricle air-bubbles rising from deep within the heart. The right heart was opened under water, when air-bubbles escaped from it. The coronary arteries contained no air, and the heart's musculature and valves were normal. Lungs and pleuræ were sound. Air-bubbles were also found in the right spermatic (ovarian) vein. The unopened uterus was placed in alcohol and opened some weeks later. It contained a placenta prævia centralis, the principal part attached to the right and posterior wall. It was partially detached on the right side, but no large vessel-lumina were observed. The author concludes that it is improbable under the manipulations of version that air was pressed into the veins, but believes that this took place immediately after the version was complete. At the moment when the foot hung from the vagina a violent pain and gush of bloody water occurred, and *immediately* the radial pulse failed, while respiration persisted. It is believed that at this moment the air between the uterine wall and the detached surface of the placenta was pressed into the gaping lumina of the veins. Further, this air was, by the sudden lowering of abdominal pressure due to cessation of pain and bearing down, aspirated

into the spermatic (ovarian) vein, and thence into the vena cava and right heart. Three cases in the last six years occurring in this clinic (Universitäts Frauenklinik, Berlin) show that this accident is not so rare as many imagine.

The Histology of the Human Amnion and Umbilical Cord.

Lange (*Zeitschr. für Gebürtshulfe und Gynäkologie*, Bd. xxviii., H. 1) presents a contribution to the histological anatomy of the amnion and umbilical cord in the human embryo. His conclusions are as follows:

1. The epithelium of the amnion is not cubical or cylindrical, but a single layer of pavement epithelium.

2. The granulation of the dead amniotic epithelium does not depend on the presence of fat.

3. In the amniotic epithelium there are no open mouths of lymph passages. The pretended stomata are artificial, and arise through the rupture of degenerated mucous cells.

4. The umbilical epithelium is, as a rule, a three-, seldom four- or five-layered laminated epithelium, whose deep layer consists only of flat cells.

5. During embryonic life the differentiation into a laminated epithelium appears on the umbilical cord earlier than the division of the epithelium.

6. "Stomata" are not found in the epithelium of the umbilical cord.

7. The umbilical cord of a mature fœtus contains numerous elastic fibres within the connective tissue.

8. The cord contains no other lymph channels than the connective-tissue corpuscles of Virchow.

9. These capillary lymph channels are most probably susceptible of injection.

10. Between the epithelial cells of the cord can be found no branches of lymph channels.

Anatomy and Physiology of the Circulation of the Newborn.

Strassmann (*Archiv für Gynäkologie*, Bd. xlv., H. 3) gives the results of his investigations concerning the anatomy and physiology of the circulation in the newborn. Briefly these may be tabulated as follows:

1. The explanations heretofore accepted as to the cause of the closure of the ductus arteriosus are not satisfactory:

a. Thrombosis is seldom found, and is pathological.

b. Self-closure by contraction of the duct is not demonstrated.

c. Changes of position of the thoracic organs with bending of the duct after inspiration has no anatomical basis.

d. The post-partum changes in the duct walls are neither peculiar nor characteristic, as they also occur in the umbilical vessels.

e. The impulses mentioned in *b* and *d* favor the definitive obliteration of the duct.

2. The closure of the duct comes instantly and mechanically.

3. The manner of entrance of the duct into the aorta makes possible such mechanical closure.

4. From the fifth month in the human fœtus a progressive development of

the angle made by the anterior wall of the duct at its entrance into the aorta forms a valvular duplication which closes the duct at the most favorable point, which is that at which the arch of the aorta becomes the descending part of the same. Similar conditions are found in fœtal sheep, dogs, and cats.

5. The progressive differentiation between the pulmonary and aortic systems affords an example, as seen in the development of the valve at the foramen ovale.

6. In order to close the exit from the duct to the aorta, respiration is essential. Thereby the pressure in the right heart and pulmonalis sinks, and later rises in the left heart and in the aorta. Then the aortic orifice of the duct (already partially empty) is mechanically closed.

7. The closure does not happen—

a. If the breathing be insufficient.

b. If, by reason of premature breathing through aspiration of blood, the duct be overstretched.

c. If abnormal conditions of pressure obtain in the large vessels.

d. If the development of the duct be incomplete.

8. The finding of patency of the duct in later life without disturbance of the circulation is due to mechanical embarrassment of the aortic mouth.

9. A secondary patency of the duct arises from separation of the closed aortic orifice from the aorta, and the original closure is still demonstrable.

10. Attempts to inject with coagulated fluids confirm the closure of the duct.

11. As late as the eighth day the duct can be injected from the pulmonalis.

12. It can be injected from the aorta only in fœtuses of defective development; in overstretched ducts, or by excessive pressure in the aorta.

13. Through overpressure from the aorta the duct can be filled only after distending all the arterial system, and then—

a. In the earliest days the duct-opening is forced apart; or,

b. In the second half of the first week the anterior duct wall is inverted.

14. The aortic part of the distended duct seems narrower than the pulmonary, because of the pressure on its walls from the aorta.

Menstruation and Ovulation.

Leopold and Meronoff (*Archiv für Gynäkologie*, Bd. xlv., H. 3) summarize as follows:

1. Menstruation is generally accompanied by ovulation, though it not infrequently occurs without the latter.

2. This periodical flow of blood depends on the presence of the ovary and of a sufficiently developed uterine mucous membrane—two factors without whose common action no typical outflow can occur; hence it does not depend on the maturity or rupture of a Graafian follicle. If either factor be wanting, no flow occurs, however sound the other may be.

3. If ovulation have occurred, it may generally be referred back to the time of the hemorrhage. It requires for its development a strong efflux of blood to the genital organs for several days, and forms then a typical corpus luteum.

4. Outside of the time of the four-weekly bleedings ovulation also occurs, but this is seldom under physiological conditions.

5. Ovulation and the formation of a typical corpus luteum may take place through determination of blood to an immature follicle.

6. Even at the time of senile atrophy of the ovary, normal follicles still occur, and these come to physiological eruption, forming a typical corpus luteum.

On the whole, menstruation is the more frequent; menstruation without ovulation the more seldom. It is certain that at the time of periodical hemorrhage ovulation can occur, even when no external bleeding is observed.

The Care of the Navel.

Doktor (*Archiv für Gynäkologie*, Bd. xlv., H. 3) reports his experience relative to the treatment of the umbilicus in newborn infants and the prevention of infections. In newborn infants the navel forms a columnar projection of the skin, on the top of which the cord is attached—a sharp line of demarcation, the navel ring, separating the cord from the skin. On its margin are numerous vessels that go to the border of Wharton's gelatin, but do not enter into it. When the cord is ligated its tissues lose their viability, and must separate and fall away, leaving the wound covered with a living structure.

We must regard the navel as a physiological wound of the abdomen of the newborn, its healing differing in no way from that of any other wound, the only peculiarity of the process being the topography of the wound.

In typical cases it heals by first intention. This small wound is specially liable to infection and resultant maladies, light or severe:

1. Because of its condition; it is not merely a wound of the abdominal skin, but also of its wall and in closest proximity to the abdominal membrane (peritoneum), which is very susceptible to infection.

2. The peculiarity that three great vessels lie free in this wound.

3. The third great factor tending to infection is the disproportionately large mass of dead tissue—the remains of the cord.

4. Again, this wound is peculiarly inclined to an excessive formation of granulations.

5. The frequency of development of anomalies and aberrations of the umbilicus also predisposes it to disease.

According to Erös, 68 per cent. of umbilical wounds do not heal in a normal manner; and of these, 45 per cent. suffer from fever. How often these cases terminate fatally is not known.

In treating the navel the desire is to obtain healing without infection. The ordinary method is to simply ligate the cord some eight to ten centimetres from the body and wrap it in an oiled rag, after careful disinfection with sublimate solution, 1:1000, and then binding it to the abdomen with a bandage. At each bathing of the child the cord is washed, and if there be not much secretion a new bandage is applied, or a cotton wad is placed over the navel first. Too often cleanliness in the latter matter is neglected by the nurse. The author omitted the oiling of the rag in the above method, as it hindered mummification. The temperature was taken twice daily. Iodoform was applied to the wound, or, if needed, a weak carbolized wash. With the above treatment, 35 per cent. of cases had fever, and of these 16 per cent.

showed infection. The plan was then changed. The cord was removed as early as possible and all wetting omitted. The bandage was changed daily. After this, 25.8 per cent. showed a rise of temperature, and of these 10 per cent. had infection. Further improvement resulted when efforts were made to hasten mummification of the cord. Ligatures applied closely to the belly were next tried, the stump being one centimetre long. This gave 11.88 per cent. of fever and 3.46 per cent. of infection.

As a general rule fever occurring during the healing of the navel is due to infection, notwithstanding the failure of local symptoms, and especially the coincident frequent digestive disturbances cause no fever.

The author summarizes the treatment of the umbilicus as follows:

1. Cut the cord as closely as possible.

2. The bandage once applied should not be changed except for good cause, and preferably the bath should be omitted.

Placental Moles.

Kehler (*Archiv für Gynäkologie*, Bd. xlv., H. 3), after giving an exhaustive series of statistics regarding mole pregnancies, arrives at the following conclusions:

Twelve per cent. of his cases had had precedent abortions. Previous general health or genital disease seemed to exercise but little influence in the production of moles. Vomiting in such cases the author does not find more common than in normal pregnancies. A feeling of debility seems to be more common and more severe in mole than in normal pregnancies. Pain in the abdomen was noted in 42.5 per cent., but there was nothing characteristic in the pain and no tenderness was noted. Œdema of the lower extremities was seen in 30 per cent. of cases. This condition seems more frequent here than in normal pregnancies, but in some of the cases nephritis was coincident.

A significant largeness of size of the uterus, not corresponding to the time of the pregnancy, was noted, and this increase in size was without evidences of fœtal extremities or heart-beat. This symptom the author regards as suggestive.

Uterine hemorrhage occurred in forty-one out of fifty cases; it was irregular and intermittent, and in fourteen cases it was severe.

The author has demonstrated that the majority of mole pregnancies end in abortion between the fourth and fifth months.

It has been found in forty-five out of fifty cases that the duration of birth was twenty-four hours. In two-thirds of his cases the duration of labor was under six hours. Labor pains were weak in 22 per cent.; regular and moderately strong in the same percentage; strong in 52 per cent., and intermittent in 4 per cent. Hemorrhage was entirely absent in 12 per cent., but in somewhat over half of the cases, severe hemorrhage occurred during birth. In some this bleeding was severe enough to produce syncope. The size of the moles varied from one-half to three kilos, and their diameter from eight to thirty centimetres.

In two-thirds of the cases the expulsion of the mole can be left to uterine ontractions alone. If hemorrhage be present, the antiseptic vaginal tampon-

ade should be used. The author advises induced abortion in all cases when the diagnosis is established. Regarding the puerperal period in such cases, two-thirds of all patients experience no special disturbance; the average duration of the puerperal period was fifteen days. Complete restoration to health followed in two-thirds of the cases.

Subsequent menstruation occurred normally in 51 per cent., freely in 37.7 per cent., irregularly in 6 per cent., returned but once in 2.2 per cent. In 5 per cent. there was no return of menstruation. Secondary sterility has been observed scarcely more frequently than after abortion.

The pathology of the placental mole the author regards as the following: 1. The membranous tufts have the same form as the normal embryonic tufts or chorion tufts of the first two months.

Moles have certain important life peculiarities, as: 1. The membranous tufts consist of living, growing tissue elements. 2. They draw their nutrition immediately from the uterine walls. 3. Notwithstanding this apparently unfavorable condition, the tufts do not fall into necrosis as the chorion tufts do after withdrawal of the blood supply, but continue to live and grow.

Fœtal Death caused by Laceration of the Umbilical Artery.

Westphalen (*Archiv für Gynäkologie*, 1894, Bd. xlv., H. 1) reports a case of tearing of the umbilical artery before the evacuation of the liquor amnii, with the consequent death of the child. The mother was a II-para, perfectly healthy, and with a normal pelvis. The child presented by the breech, and was dead when born. The umbilical cord was looped firmly around the child's neck. On examination the placenta was found to be of medium size, fairly soft, and without any kind of infiltration. Membranes intact, and between them were numerous clots. The tear in the membranes was near the placental edge. A considerable defect in the placental amnion was to be seen, a large segment of the amniotic covering being stripped off, and just beneath this the artery could be seen obliquely torn across. The child showed a syphilitic eruption on the buttocks and legs, and microscopical examination demonstrated a general degeneration, specific in character, although there was nothing in the history or appearance of the mother to indicate any infection.

Puerperal Fever.

Drage (*Lancet*, 1894, Nos. 3678 and 3679) contributes a most interesting and valuable article on the pathology and treatment of puerperal fever. He concludes that puerperal fever depends primarily on conditions connected with the mother. Delivery, even of the most favorable kind, provides a nidus for the growth of bacteria, but deliveries after which what may be called refuse material remain behind, or during which wounds of the maternal parts are produced, or deliveries accompanied by venous thrombosis or embolism, afford specially suitable nidi for the growth of bacteria. The author points out that such bacteria have a definite position in the economy of Nature—that of the breaking up of dead animal substances. From the purely saprophytic forms, by the process of natural selection, other forms develop. Of these a number produce disease in the human body, of

which some, by exposure to fixed conditions for a length of time, have acquired fixed characteristics, both structural and functional, and these are those which cause such diseases as scarlet fever.

Other forms, like those which produce sepsis — for the reason that the conditions which are necessary in the human body for their growth are now much better known, and consequently dealt with, have not such fixed characteristics, either functional or structural. The variations, therefore, in the symptoms which they produce are much wider than those of the zymotic diseases. The various complications of sepsis are considered, and the author endeavors to show that the prevention of septic fevers is to a great extent dependent on the care taken of the woman from the advent of her labor to the close of her lying-in. Notwithstanding the efforts to save the woman from harm, accidents occur, as in surgery; but these, with our present means of treatment, can, if the cause of the disaster be discovered, be prevented in not a few cases from terminating disastrously.

GYNECOLOGY.

UNDER THE CHARGE OF

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OF NEW YORK.

The Influence of Cœliotomy on Tuberculosis.

Stchégoleff (*Archives de Méd. experimentale et d'Anat. path.*, September 1, 1894) draws the following conclusions from experiments on dogs: Tuberculous peritonitis in dogs can be cured by cœliotomy, provided that the operation is performed during the incipient stage of the disease; otherwise it is merely palliative. Following abdominal section the tissues around the tubercles become infiltrated with embryonic cells, which constitute a barrier to the extension of the focus and attack the bacilli; undergoing organization, they are transformed into fibrous tissue, the specific germs being eventually destroyed and absorbed. The actual curative influence of the operation is probably due to traumatism of the peritoneum, thermal action, and the effect of air and light, the combined result of these factors being a peritoneal irritation followed by a more or less intense inflammatory reaction, which arrests the morbid process. Contrary to the views of Vierordt and Riva, the complete evacuation of the fluid in tuberculous ascites is not the sole cause of the cure. In the writer's experience, the curative effects of abdominal section were equally marked in cases in which no fluid was present.

Ether-Narcosis in Gynecological Operations.

Fritsch (*Centralblatt für Gynäkologie*, 1894, No. 35) affirms that the superior advantages of ether over chloroform are not sufficiently appreciated by

gynecologists. If narcosis be profound the breathing is no more disturbed with ether, while the operator is less troubled by the intestines getting in his way. There is less shock in abdominal operations than when chloroform is employed, especially in weak and anæmic subjects, whose pulse is often actually improved by ether. This is noticeable in cases of ruptured tubal pregnancy, in which many patients might have been saved in the past by using ether instead of chloroform. The writer calls attention to the fact that general surgeons have long recognized the advantages of the former anæsthetic, and thinks that it is time that gynecologists should follow their example.

GARRÉ (*Deutsche med. Wochenschrift*, 1893, No. 40) is equally emphatic in his commendation of ether, which he believes possesses decided advantages over chloroform, as regards not only safety of administration, but subsequent ill effects. He denies the existence of nephritis following the use of the former. The only contra-indication to its use is pulmonary disease. Mixed narcosis is undesirable, as well as dangerous.

TSCHMARKE (*Deutsche med. Wochenscrift*, 1894, No. 4) thinks that ether is preferable to chloroform under all circumstances except in bronchitis and other pulmonary troubles, where it is necessary to obtain complete muscular relaxation(!), and in operations about the face where the cautery is used. It is especially indicated in operations upon patients with cardiac lesions. He reports one death from respiratory paralysis in five hundred cases.

GROSSMANN (*Deutsche med. Wochenschrift*, 1894, No. 3) states that ether is used almost entirely in Landau's clinic, only one death having been noted in 23,804 cases collected by him.

CASTRATION FOR UTERINE FIBROMYOMA.

FRANK (*Correspondenzblatt für Schweizer Aerzte*, 1894, No. 7) reports twenty cases in the Berne clinic (with no deaths), in three of which it was impossible to remove the adnexa. In twelve patients the hemorrhages promptly ceased; in nine the tumor diminished in size to such an extent that it could no longer be felt, even under narcosis; in ten pain and pressure-symptoms were entirely relieved. More or less marked climacteric disturbances were noted in seven. The writer recommends that in cases in which hemorrhage is a prominent symptom thorough curettage and cauterization of the uterine cavity should be performed a few days before the operation.

TOTAL EXTIRPATION OF THE PROLAPSED UTERUS.

RECLUS (*Archives de Tocol. et de Gyn.*, 1894, No. 2) believes that hysterectomy does not effect a radical cure in cases of procidentia, since it is often necessary to operate subsequently for the cure of cystocele and rectocele. Such has been his own experience. He does not approve of the radical operation even when supplemented by colporrhaphy.

HERNIA UTERI IN A PSEUDO-HERMAPHRODITE.

BROHL (*Deutsche med. Wochenschrift*, 1894, No. 15) reports the unique case of an unmarried woman, thirty-six years of age, who had an imperforate penis

four inches and a half long when erect, the external genitals being otherwise those of a female. In the left labium majus was a painful tumor, which could not be reduced. On examination it was thought to be the uterus, at one side of which was a small body which increased in size during the menstrual period, and was consequently taken to be an ovary. The diagnosis was confirmed on incising the hernial sac. The uterus with its adnexa were amputated, the stump formed by the elongated cervix being stitched in the wound. The specimen consisted of a uterus bicornis, the left ovary being well developed, while the right was rudimentary. The Fallopian tubes were much dilated. Neither testicles, vesiculæ seminales, nor a prostate could be found. The patient made a good recovery.

Microbes in the Normal Urethra.

V. Gawronsky (*Münchener med. Wochenschrift*, 1894, No. 11) by microscopical examination of the secretions of the normal urethra in sixty-two females, found pathogenic bacteria in twenty-four per cent. of the cases. Pathogenic bacteria were observed in twelve instances, and the bacterium coli commune in two, the latter being peculiarly interesting. Reymond has called attention to the fact that the latter microörganisms may be a cause of cystitis in women who have never had instruments introduced into the bladder, and reports seven cases which confirm this opinion. Wreden has also proved this fact experimentally.

Ventro-fixation Without Opening the Abdomen.

Czempin (*Deutsche med. Wochenschrift*, 1894, No. 21) describes a new method of ventro-fixation which he has practised successfully in eleven cases. The uterine cavity is first curetted with the patient in the dorsal position. The uterus is then replaced manually or with a sound, adhesions being separated. A silk suture is passed through the cervix, is tied, and the ends are attached to a small ring on the anterior surface of the sound, which is thus held in position. The patient is then placed in Trendelenburg's posture and a small incision is made in the median line just above the symphysis, exposing the peritoneum. The fundus uteri being held in contact with the abdominal wall, a large curved needle carrying a silk suture is passed through the edge of the wound into the muscular substance of the uterus at a point near the right cornu, in front of the origin of the tube. It is brought out at about the middle of the fundus, is re-entered nearly at the same point and (while an assistant tilts the uterus so as to bring its left horn beneath the peritoneum at the bottom of the wound) traverses the muscular substance of the organ emerging from it behind the origin of the left tube, and thence through the edge of the external wound at a point an inch higher up than the opposite point of entrance. A similar suture is introduced forming a cross with the first at the top of the fundus. The ends of the sutures are secured with clamps, and the sound is withdrawn from the uterus, which sinks downward a little. The abdominal wound is then closed, a strip of iodoform gauze being inserted in the lower angle for a couple of days. The fixation sutures are now tied each with its fellow on the same side of the incision. The operation does not exceed half an hour, and no blood is lost. All the sutures are removed on the tenth day, and the patient is ready to be dis-

charged two days later, without a pessary or other support. The eleven cases in which this operation was done were successful, the uterus remaining anteverted and movable after the lapse of several months.

[The principle involved in this operation is essentially the same as that of Krug's "transperitoneal hysterorrhaphy," described by him several years ago.—H. C. C.]

PÆDIATRICS.

UNDER THE CHARGE OF
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ASSISTED BY
THOMPSON S. WESTCOTT, M.D.,
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TREATMENT OF TUBERCULOUS PERITONITIS.

MARFAN (*La Presse Médicale*, August 18, 1894, p. 261) considers the treatment, both medical and surgical, of tubercular peritonitis in children, and reports the satisfactory results of a purely medical treatment in seven cases coming under his observation in the preceding eighteen months. Under the head of medical treatment he includes:

1. *Rest.* When possible he conjoins with this a sojourn in the country or at the seashore, with suitable climatic conditions. In this connection permanent aëration, or open-air treatment, as practised in sanatoria would be a valuable adjunct.

2. *Diet.* This should be as substantial as the digestive functions permit.

3. *Drugs.* The *sirop iodo-tannique*, in the author's opinion, is one of the best anti-tubercular remedies for children. Cod-liver oil, creosote, or its derivatives, phosphates, or hypophosphites, may also be employed with advantage, while arsenic is of value, but must be kept within the limit of causing gastro-intestinal derangement.

4. *Counter-irritation.* A coating of tincture of iodine is applied to the abdominal parietes, and when dry is covered with a coating of flexible collodion. The latter in a measure immobilizes the abdominal wall and the organs beneath and diminishes by compression the hyperæmia of the affected parts. According to the effect upon the skin these applications are renewed weekly or fortnightly.

5. *Laxatives* are to be given from time to time, preferably oil; for diarrhœa, intestinal antisepsis is advised; and in case of colic, laudanum or elixir of paregoric is prescribed.

The surgical treatment embraces puncture with or without injection of medicated solutions, and laparotomy.

Simple puncture is indicated in case of an abundant ascites which shows no tendency to recede under medical treatment such as above outlined.

In encysted collections puncture is useful as a method of exploration, and sometimes, though exceptionally, curative. After evacuation Debove and Rendu have tried the injection of antiseptics—the former boric acid solution, the latter *naphtol camphré*. This method has given little encouragement. The same may be said of the injection of the blood-serum of dogs, as practised by Kirmisson and Pinard, and of the injection of sterilized air, according to the suggestion of Von Mosetig-Moorhof.

Laparotomy is applicable under the following conditions: First, fibro-caseous peritonitis with ascites; second, localized peritonitis with encysted collection; and, third, intestinal occlusion occurring in the course of a tubercular peritonitis. Even in these cases contra-indication to laparotomy should be furnished by the coexistence of other tubercular lesions in thoracic organs or the intestine, when extensive and advanced. That is to say, a pulmonary tuberculosis limited to the apex and without signs of softening, or foci of tubercular disease in bone, are not contra-indications. But softening in the lung, tracheo-bronchial adenopathy, or tuberculous enteritis should prevent surgical intervention.

Chronic albuminuria is also a contra-indication to operation, whether the renal lesion be or be not of specifically tubercular nature.

Contagiousness of Angina à Streptocoques.

Variot (*Journal de Clin. Enfance*, in *Revue mensuelle des Maladies de l'Enfance*, September, 1894) reports an interesting observation on the contagiousness of pseudo-membranous angina in which the Loeffler bacillus is not present.

In a certain family a boy of three years developed a temperature of 102.2° to 104° F., with an exudate upon the tonsils, at first discrete, then involving the uvula and the pharynx, with pronounced cervical adenopathy, presenting exactly the picture of diphtheria. At the end of eight days under antiseptic treatment the danger was over, but the voice was hoarse, and remained so for some time. Several days later the sister, a child of eleven years, who had previously had diphtheria, and for three years had continued to have a swelling of the glands of the neck, was taken in turn with an extensive pseudo-membranous angina. Cultures showed the existence of angina à streptocoques. Several days later the mother, aged forty years, who had nursed the children night and day, was attacked in turn. In this case the angina was not so extensive, the exudate being confined to the tonsils, the pillars, and to a small area at the lower part of the pharynx; but for some time the false membrane was reproduced, and after suspension of treatment was reproduced anew. This membrane was found to contain only streptococci. In addition to the cases mentioned, a domestic in the house contracted a sore-throat of the same character. All the cases recovered. While the primary case in the little boy was not examined bacteriologically, the author does not doubt that it was of the same nature as the other cases were proved to be.

An Early Grave Complication of Pharyngeal Diphtheria.

Aufrecht (*Therapeutische Monatshefte*, 1894, No. 3, p. 100) calls attention to a particular form of diphtheria of the pharynx, which, despite its limited local extension, rapidly kills the patient in two or three days. It has been

held that these almost foudroyant cases were to be attributed to a grave infectious myocarditis. Recently, however, the author has observed three cases of this kind where the autopsy showed no trace of myocarditis, but a subacute nephritis. The author, therefore, insists upon the importance of systematic examination of the urine from the beginning of diphtheria, even when no symptom points to a renal lesion.

The symptoms observed in these cases have been very great frequency of pulse, a semi-comatose condition, delirium, high fever, and marked albuminuria. Guided by these cases the author has been able in a fourth case to combat this nephritis in the beginning by the administration of large quantities of alkaline and saline water (Wildungen) for the purpose of increasing diuresis and relieving the choked-up kidneys.

Serum-Therapeutics of Diphtheria.

Roux, of Paris, in a communication to the Eighth International Congress of Hygiene and Demography, Budapest (*Lancet*, Sept. 22, 1894, p. 675), reports the results of the serum treatment of diphtheria in the wards of l'Hôpital des Enfants Malades, from February 1st to July 24th of the present year.

Since 1891, with the collaboration of L. Martin and A. Chaillou, the author has carried out experimentation along the lines first indicated by Behring and elaborated subsequently by this investigator, either alone or in conjunction with Ehrlich, Boer, Kossel, and Wassermann, whose observations upon the treatment of human patients have so recently been brought before the profession. (See *Deutsche medicinische Wochenschrift*, 1893, Nos. 17 and 18; 1894, No. 16. *Zeitschrift für Hygiene und Infektionskrankheiten*, vol. xvii., No. 3.)

For therapeutic purposes it is desirable to immunize large animals so that large quantities of serum may be at disposal. The author has, therefore, used the horse, which is most easily immunized and stands the toxine much better than goats, sheep, or cows, although, according to Behring, an animal supplies a serum of greater antitoxic power in proportion to its greater sensibility to the toxine. The horse, however, has furnished very efficacious serum for the author's experiments. Experiments were begun in the hospital February 1st. Visits were made every day to the wards and children treated in whatever stage they were found. No selection was made, so that the gross results during the months of treatment may be set side by side with those previously recorded. The local treatment remained the same (glycerin and salicylic acid, boric acid washes). Beside the statistics for comparison thus furnished, the results of treatment of diphtheria in l'Hôpital Trousseau, where the serum was not in use during this period, may be likewise contrasted.

The total mortality of children admitted to the diphtheria wards during the past four years gives a mean of 51.71 per cent. During the period of experimentation 448 patients were admitted and received the serum treatment, and of these 109 died, a mortality of 24.5 per cent. As compared with the previous experience under the same conditions, the difference between these percentages represents the benefit conferred by the treatment.

During the same months 520 children with diphtheria were admitted into the Trousseau Hospital. Of these, 316 died, a mortality of 60 per cent.

Again, to distinguish between angina and croup requiring tracheotomy, the mean mortality of angina for four years has been 33.94 per cent.; during the months of treatment with serum the mortality declined to 12 per cent., while in the same period at the Trousseau it was 32 per cent.

Among the croup cases submitted to tracheotomy the mean mortality for four years was 73.19 per cent. During the serum treatment it fell to 49 per cent., while at the sister institution a death-rate of 86 per cent. was recorded.

Taking now into account the presence of false diphtheria, which, according to statistics, covers one-fourth at least of the cases admitted, and which exhibits naturally a very slight mortality, the author excludes from the 448 cases 128 which were proved by bacteriological test not to be truly diphtheritic, and in addition 20 cases which succumbed before receiving serum treatment. This leaves 300 cases of true diphtheria treated by serum, with a mortality of 78, or 26 per cent. The earlier work of MM. Roux and Yersin and MM. Martin and Chaillou established the fact that in the same hospital the mortality of children attacked by diphtheria, as confirmed by bacteriological examination, was 50 per cent.

To all children admitted 20 c.c. of serum were administered at one insertion under the skin of the side of the abdomen. If the bacteriological examination showed that the patient was not diphtheritic the injection was not repeated; 128 children affected with various forms of angina were thus treated without the least inconvenience. It even appeared that the angina was relieved in a number of cases; and they remained some days exposed to contagion without being infected, a proof of the prophylactic value of the serum. In diphtheritic cases, twenty-four hours after the first injection, another of from 10 to 20 c.c. was given, and this usually sufficed to complete the cure.

The principal modifications produced by the serum upon the course of the angina are as follows: The general condition remains good or improves very quickly, provided the treatment be not commenced at too advanced a period of the infection. The pale and leaden faces are scarcely seen in the wards; the expression of the children is more lively and cheerful. Duration of the disease is curtailed, the appetite quickly recovers, and wasting is slight. The sequelæ are more rare—a few cases of paralysis of the soft palate of short duration, one case of paralysis of a lower limb, and one case of total paralysis supervening during the convalescence of a child admitted struggling on the sixth day of the disease. Three children died from syncope—one in less than twenty-four hours, and another in less than twenty-six hours after admission, and the third succumbed five days after commencing treatment.

The false membrane ceases to grow within twenty-four hours of the first injection, and detaches itself in thirty-six or forty-eight hours, at the latest by the third day. The bacillus disappears from the throat at the same time as the false membrane, most frequently cultures failing to produce colonies from the third to the fifth day. The temperature falls promptly; the defervescence is abrupt, as if the disease had been suddenly checked. The pulse returns to normal two or three days after the temperature.

As it is well known that cases in which the bacillus is associated with the streptococcus are of graver import than pure diphtheria, so in these cases the serum is less efficacious; it only produces good results when injected in strong and repeated doses. In spite of this the disease is of longer duration, and the temperature and pulse return only slowly to normal, and temperature does not fall abruptly. Broncho-pneumonia is a formidable complication, always threatening in these cases of associated diphtheritic angina. Among the 300 diphtheritic cases, 169 had angina, and 120 were affected with pure diphtheritic angina; of these latter, 9 died, or 7.5 per cent. If 7 who were in the wards less than twenty-four hours be deducted, there remain 115 cases of pure angina with 2 deaths, a mortality of 1.7 per cent. Forty-nine patients had angina with associated streptococcus; they yielded 12 deaths, a mortality of 24.2 per cent. Deducting 4 children less than twenty-four hours in the hospital, it gives 45 cases with 8 deaths, or 17.7 per cent. Under the old conditions, in the same hospital, this class of cases gave a mortality of 87 per cent.

Of cases subjected to tracheotomy 121 have been treated; 56 died, a mortality of 46 per cent., as contrasted with 68 per cent. in previous years. To separate pure croup from associated croup, the pure croups numbered 49, with 15 deaths, a mortality of 30.9 per cent. Deducting 4 cases less than twenty-four hours in the hospital, there remain 45 cases with 11 deaths, or 24.4 per cent. The cases of associated croup numbered 72, yielding 41 deaths, a mortality of 58.3 per cent. Deducting 10 cases in the ward less than twenty-four hours, there remained 62 cases with 31 deaths, or 50 per cent. The mortality previously had reached 80 per cent. Finally, it may be stated that locally all caustic or poisonous substances are proscribed. Two or three times a day is used a wash of boric acid, or, better, of water, to which are added 50 grammes of Labarraque's solution per litre.

It may be added, as a matter of interest, that among the 300 cases, 85 had concurrent diseases—33 measles, 13 scarlatina, 6 tuberculosis, 3 whooping-cough, 3 varicella, and 39 broncho-pneumonia.

Fatal Pneumonia in Infants from Septic Infection during Birth.

Legry and Dubrisay (*Journal de Médecine de Paris*, June 3, 1894) report two cases in which the mothers recovered from labor, but the infants died of septic inspiration pneumonia. In the first case, a primipara, the membranes ruptured early and the liquor amnii became fetid, delivery being retarded by a rigid cervix. Tarnier's dilators and the forceps were used. The child was born asphyxiated, covered with fetid slime. Aspiration relieved the air-passages of a quantity of mucus, and respiration was established. The infant died sixty hours later with well-marked broncho-pneumonia. In the second case, also, the membranes ruptured early, and the child was not born till forty hours later. The mother had a very profuse greenish vaginal discharge. The child's respiration was embarrassed from birth, and it died after eleven hours. Pneumonia and pleurisy were shown by the autopsy. The pleural fluid and other fluids and tissues of the body contained streptococci, which were found to be present also in the vaginal discharge of the mother.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Tubercle Bacilli in the Nasal Cavity of Healthy Individuals.

Straus (*Archives de Méd. exper. et d'Anat. path.*, 1894, vi., No. 4, 633) has succeeded in demonstrating the presence of virulent tubercle bacilli in the nasal cavities of persons, who, though themselves healthy or affected only with some chronic nervous disease, had been inmates of the same wards with phthisical patients for some time previous, or were physicians in attendance upon such patients. In none was any trace of tubercular trouble discoverable. Yet in nine of twenty-nine cases examined the presence of the bacilli in the nasal mucus was proved.

The investigation was conducted as follows: The whole nasal cavity as far as possible was swabbed out with small pledgets of cotton. These were thoroughly shaken in sterilized bouillon or water, and this was then injected into the peritoneal cavity of guinea-pigs. In seven cases the animals died of septicæmia or of purulent peritonitis before it was possible to determine the presence of any tubercular process; thirteen of the animals remained well, and when killed showed no trace of tuberculosis; in nine cases the animals died or were killed at the end of from three to five weeks, and when examined showed tubercular lesions, often very pronounced, in which the presence of tubercle bacilli was demonstrated. Thus, in nearly a third of the cases examined the nasal cavity contained virulent tubercle bacilli in sufficient numbers to cause pronounced lesions in guinea-pigs.

The importance of the results of these experiments of Straus is very great. In 1875 Laveran showed by statistics that the mortality from tuberculosis among the inmates of the military infirmaries was much greater than that from the same cause in the standing army, and somewhat later Debove drew attention to the greater frequency of phthisis among those who had been long residents of the Hospital Bicêtre because of chronic nervous or other non-tubercular disease. The investigation of Cornet, in 1888, into the mode of dissemination of the tubercle bacilli outside the body afforded an explanation of this greater prevalence of tuberculosis in hospitals, almshouses, nunneries, etc., since he demonstrated the presence of the bacilli in the dust and on the walls of the wards of these institutions; and infection through inhalation of this infectious dust was inferred as the probable mode of communication of the disease. In the experiments of Straus we have direct proof of the correctness of this view, for the tubercle bacilli are found in the very act of entering the body through the respiratory tract. Still it must not be supposed that in all the cases in which the bacilli were found in the nasal cavity tuberculosis would have resulted; the great majority of the germs would undoubtedly be cast off in the nasal mucus and never find entrance to the body.

The results of Straus also afford another instance of the important functions of the nasal mucous membrane in ridding the inspired air of the micro-organisms which it may contain, for in none of the cases in which tubercle bacilli were found was there any sign of tuberculosis of the lungs, which would have been expected in at least some of them if the germs had found access to the deeper respiratory tract.

The Gonococcus: Its Cultivation on Artificial Media and Inoculation in Dogs.

For nearly six years after its discovery all efforts to cultivate the gonococcus artificially were unavailing, and in consequence the proof of its pathogenic nature was incomplete. In 1885, however, it was successfully cultivated upon human blood-serum, and its virulence was demonstrated through inoculation into the human urethra. Until very recently human serum has been supposed to be a necessary ingredient of all culture media for its growth, and the difficulties of obtaining this in sufficient quantity have prevented any very general use of cultures of the gonococcus for diagnostic purposes. About a year ago it was discovered that the addition of urine to the culture medium afforded the conditions necessary. It was at first supposed that this depended upon the presence in the urine of certain salts necessary for the growth of the gonococcus. This Turró (*Centralbl. für Bakt. u. Parasit.*, 1894, xvi., No. 1) shows to be a mistake. What is needed for the cultivation of the gonococcus is an *acid* medium.

Although the freshly voided urine in gonorrhœa is usually alkaline in reaction, Turró points out the fact that this is due in great part to its content of pus, since, when this has settled, the supernatant liquid is acid. In this acid urine the gonococcus develops vigorously. The idea was thereby suggested that this might be due to the acidity of the urine, and culture media were prepared of various degrees of acidity to test its accuracy. It was found that the gonococcus grew well on ordinary gelatin which had not been neutralized. Even the addition of a drop of hydrochloric acid to each 100 c.c. of this medium served only to delay the growth, not to prevent it.

These facts are important, since they make it possible very easily to obtain pure cultures of the gonococcus from gonorrhœal pus. Its simple inoculation into such an acid medium is sufficient, since the strong acidity of the medium prevents the growth of any other germs which may be present.

For details of the appearance of the cultures under various conditions we must refer to the original paper.

Another important fact developed by Turró is that the gonococcus thus grown on acid media possesses pathogenic qualities for dogs. A little of the culture introduced under the prepuce, without necessary injury of the mucous membrane or introduction into the mouth of the urethra, produces intense purulent inflammation, which may extend up the urethra to the bladder and kidneys, or may result in a general systemic infection and pyæmia. The gonococci obtained by subsequent culture from these lesions are somewhat smaller than those of man, but are otherwise similar. The infection is less severe in bitches. It was found that gonococci thus virulent

when grown on acid media lost their virulence when transferred to alkaline or neutral media. On acid media their virulence was retained for more than a month.

Sudden Death due to the Heart.

This is the title of an interesting article by Councilman, read before the Massachusetts Medico-Legal Society, and published in vol. ii., No. 4, of their *Transactions*.

Of endocardial conditions which may lead to sudden stoppage of the heart, thrombosis and embolism are considered the most important, though of rare occurrence. By far the most frequent causes of sudden death are to be found in disease of the heart wall, and by far the most important of these result from lesion of the coronary arteries and consequent diminution of blood supply to the heart muscle. Since the coronary arteries are "terminal arteries," as a rule having no considerable anastomoses with one another, disease of one of them may seriously impair the blood supply of that portion of the heart wall dependent upon it for nourishment. If sudden stoppage of one of the larger branches occur, infarction of the heart muscle may result. This is, however, rare, and the usual effect of interference with the coronary circulation is the growth of fibrous tissue in that portion of the wall insufficiently nourished—interstitial myocarditis. The patches of fibrous tissue thus formed are prone to stretch and become thin, in which case a true aneurism of the heart results, and, like aneurisms of the vessels, this may rupture. Other causes of rupture of the heart dependent upon disease of the coronary arteries are the formation of patches of necrosis or of fatty degeneration. Fatty infiltration, in which large deposits of fatty tissue beneath the pericardium and in the myocardium occur, is also an occasional cause of rupture of the heart.

In rare cases sudden death may result from pericarditis, where the very rapid accumulation of exudate may overwhelm an already enfeebled heart. The sudden death occasionally observed in cases of aortic stenosis is probably dependent in most cases on the inability of the already overtaxed heart-muscle to cope with a sudden increase of intra-cardial pressure brought about by exertion or by psychic influence.

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